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THE NATIONAL GEOGRAPHIC MAGAZINE

Quebec's Forests, Farms, and Frontiers

By Andrew H. Brown

FROM southern tobacco and sugar-beet fields to subarctic tundra in the north, I ranged the Province of Quebec. My journeys crossed the huge land, well over twice the size of Texas, from Gaspé cliffs in the east to gold mines and pioneer towns of the raw, rich west (map, pages 436-7).

Quebec turns two faces to the traveler. One shows wilderness, vast, lonely, almost uninhabited. The other is a far-flung pattern of fenced farmlands, green, lovingly tended, the sturdy *habitant's* "good earth."

French Canada's people offer a comparable contrast. With loyalty to their Old World language and traditions they blend frontier boldness and energy.

There's restful appeal in the old Quebec, where frugal country life exalts devotion to family and church.

In the new Quebec there is the bustle, vitality, and orderly complication of great newsprint, smelting, mining, hydroelectric, chemical, textile, and transportation industries. Before the pressure of this productive enterprise the wilderness is in grudging retreat.

Sacred Soil Rings Quebec City

My first goal was Quebec City. The fine old town is the sentimental as well as the political capital of its Province.*

On a sunny summer morning I climbed the high ramparts of Quebec City. Thick walls of the Citadel command fateful history and scenic grandeur in one majestic sweep (pages 434-5).

Beyond towers and tangled streets fields tilted up to blue Laurentian hills. Tin-roofed churches with swordlike steeples watched over distant villages. Close below curved the mighty St. Lawrence River.

Within my view was soil as sacred to the French of Canada as are Concord, Jamestown, or the Alamo to their southern neighbors. Quebec clings jealously to brave days of its past. The Province's motto is *Je me souviens* (I remember).

Jacques Cartier in 1535 brought his three tiny vessels here to the Indian village of Stadacona. The dusts of time had buried Champlain's "Habitation," built in 1608, the first permanent settlement at Quebec.

Fateful Battle Won Canada for Britain

To the west unrolled the Plains of Abraham. When Britain's Gen. James Wolfe stormed those heights one September dawn in 1759, the strategy of surprise, as much as shot and shell, sealed the fate of half a continent.

Within the Citadel itself, Roosevelt, Churchill, and Canada's former Prime Minister, William Lyon Mackenzie King, held history-making conferences in 1943 and 1944.

Down in the fascinating city we strolled along steep, narrow streets, savoring the charm of an 18th-century, French-provincial town. White and gray houses fronted on cobblestone squares ornamented with weathered but graceful statuary. Black, rust-pitted guns peered over solid walls.

Yet in this easy-going Old World setting Quebec offers all the comforts and conveniences of modern living.

We sauntered along Buade Street past the splendid Basilica (page 446). On Rue de la Fabrique we went into the store that stands, so they say, on the site of the town's first tavern.

In 1648 Jacques Boisdon was appointed

* See, in the National Geographic Magazine: "Old France in Modern Canada," by V. C. Scott O'Connor, February, 1933, and "Quebec, Capital of French Canada," by William Dow Boutwell, April, 1950.

Richard Harrington

Trade Is Warm Even Though It's Below Zero Indoors

The Hudson's Bay Company store at Port Harrison, in far northwestern Quebec, is unheated and seems even colder than outdoors. The manager needs his caribou-skin parka, warm gloves, and fur-lined cap. The Eskimo couple has brought in a fine catch of red, white, and silver fox pelts. In exchange, the manager gives them aluminum tokens, like those lying beside the order pad. The Eskimos use the disks to buy coffee, tea, tobacco, matches, traps, ammunition, and other staples.

first and sole tavern keeper in Quebec. It was stipulated, however, that he settle "in the square in front of the church so that people may go there to warm themselves." Boislon was enjoined to allow no one on his premises during church services.

Fine shops line Buade and Fabrique Streets. We couldn't resist buying samples of gay handmade woolen socks and sweaters, and gloves and a handbag made by a Quebec leatherworker.

We only looked at English silverware and china, Belgian glass, stylish furs, fine fabrics, carvings, and ceramics. But we bought six meringues in a famous French confectionery —and ate them on the spot.

Quebec a Religious Stronghold

As we wandered about the city, we were constantly reminded that Quebec is a stronghold of Roman Catholicism. Black-robed nuns and sandaled friars purposefully trod the streets. Churches by the dozen and convents and seminaries occupy choice lands.

Close to the Archbishop's Palace we visited the great Quebec Seminary and Laval University. Laval, one of 100 schools and colleges in the city, was established by the Seminary of Quebec, itself founded by Bishop Laval away back in 1663.

In the shadow of Louis XVI buildings we dropped down to Lower Town's musty alleys hidden away under massive stone walls. We threaded Sault-au-Matelot (Sailor's Leap), Sous-le-Cap (Below the Cape), Little Champlain, Du Porche, Mountain Hill, and St. Pierre Streets—byways recalling the streets of Rouen or St. Malo.*

Children chattered at our heels and got underfoot. Grinning, they heckled and wheedled, and some sang plaintive solos of *Alouette* and *Frère Jacques*, apparently thinking those the only French songs Americans could appreciate.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Coasts of Normandy and Brittany," by W. Robert Moore, August, 1943, and "St. Malo, Ancient City of Corsairs," by Junius B. Wood, August, 1929.

In one of the open fruit-and-vegetable markets, full of color, noise, and country smells, we drove a sharp bargain for a box of luscious Ile d'Orléans strawberries (page 466). We haggled with clear conscience, for all around us tongues clattered and arms waved as housewives and visitors bandied prices.

We joined the evening promenade on Dufferin Terrace, the long boardwalk that stretches in front of the Château Frontenac. Groups at the rail and on benches drank in the superb view over huddled, high-roofed old buildings of Lower Town and away down the St. Lawrence.

But strollers had eyes mostly for people walking in the opposite direction—and of the opposite sex!

Gabled and turreted Château Frontenac, the Canadian Pacific Railway's huge hotel, occupies the site where once stood the storied Château St. Louis, official residence of early governors of New France (pages 440, 444).

Horses' Hoofbeats Set Leisurely Pace

Old city or new city, Quebec promoted peace and well-being. The clangor of church bells was soothing. And the clop-clop of horses' hoofs was a metronome keeping us from hurry (page 443).

"Don't let our picturesqueness mislead you," a Quebec newspaperman warned. "Industries are booming in Lower Town, employing thousands of our people. We have newsprint mills and shipyards; shoe, furniture, and leather factories; canneries, textile mills, and bakeries.

"The huge war-built St. Malo Arsenal, with 26 million cubic feet of space, has been bought by the city, renamed the St. Malo Industrial Center, and parceled out to many diversified industries."

It was in Quebec I met Jean Marchand, and from him took a much-needed history lesson. We were lunching at the Garrison Club, third oldest men's club in Canada.

"How has this land of Quebec, once a British prize of war, grown up to be so French?" I asked my host.

"According to the history books," I went on, "British troops defeated your ancestors before the American Revolution. Didn't they take over all of eastern Canada? How did the 'conquered' French stage such a comeback?"

Jean smiled and laid down his knife and fork.

"Quebec City fell to Wolfe's troops. In 1763 the Treaty of Paris ceded all France's New World Empire east of the Mississippi, with the exception of New Orleans, to Great Britain," he recalled. "The French colonists' fate hung in the balance. But the British let the French stay on to keep their New World house in order.

"After all, reasoned the British, French explorers and *voyageurs* had opened up Quebec and Upper Canada. They knew how to live in a harsh country. They had the Indians' confidence—which the English lacked!

"That line of thought paid off. When the Americans under Gen. Richard Montgomery and Benedict Arnold attacked Quebec City in 1775-76, French and British stood side by side against them! The astonished Yanks withdrew.

"In 1760 we totaled only about 60,000 colonists and soldiers," Jean continued. "Today, less than two centuries later, three million French-speaking Canadians live in the Province of Quebec alone!

"We now outnumber our English-speaking 'conquerors' more than four to one. Once we squabbled over a continent. Now we argue politics over mugs of ale."

Quebec City would reward weeks of exploration, but my beat was a whole Province, biggest in the Dominion of Canada.

We drove away down the St. Lawrence north shore to Murray Bay (La Malbaie). We were heading for the Saguenay-Lake St. John district. Northeast of the Catholic mecca of Ste. Anne de Beaupré (page 469) the road narrowed, snaked up a mountain, and led into welcome rural solitude.

Farms Edge Forests

Fortitude endures in unpretentious country parishes like St. Tite des Caps and Les Chenaux.

Rail fences border clearings that hold the forest at bay and are home to the habitant. The country settler is farmer in the summer and woodcutter in the winter (page 467). He may stretch his income with wood carving (page 470), guiding "sports," with carpentry, trapping, or working on the road.

His wife must qualify as cook, nurse, farm hand, seamstress, and weaver. She may bear her husband a dozen children, or more.

We rolled on to Murray Bay. This trim town is trading center for American and Canadian summer colonists of the area.

At Murray Bay a group of country people entertained us at a *veillée*, a French-Canadian evening of singing and dancing.

François Villeneuve, leader, sounded forth with a bass voice round and rich as a note from a French horn. To the scratching of a fiddle they sang hearty paddling songs and hauntingly lovely *chansons du pays* (songs of the country).

Ferryboats Chug Far Below Quebec's Citadel and Steep-roofed Château Frontenac

Troops still man the star-shaped Citadel, foreground, now outmoded for defense. No shot ever has struck its walls. The British built them in 1823–32 at a cost of $35,000,000—a gigantic sum in those days. The Plains of Abraham, scene of Wolfe's victory, reach two miles upriver from the fortress. Lévis lies across the stream.

National Geographic Photographer John E. Fletcher

French Canada's "Main Street," the Mighty St. Lawrence, Curves Past Quebec

Ocean ships, steaming to and from Montreal, pass below storied walls of Quebec Province's capital. The city's dock area begins at left. The river splits in the background around the haze-dimmed Ile d'Orléans. Ships mostly follow the channel at top right, where smoke rises from the Lauzon shipyards.


Lake Mistassini
Mistassini Post
Opeskinan Lake
Manouan Lake
Northmen Lake
Opemisca Lake
Chibougamau Lake
Obabiguma Lake
Lac Papamiskan
Mistassini River
Dolbeau
Mistassini
Gouin Reservoir
Lake St. John
Pointe Bleue
Roberval
Riverbend
Shipshaw Dam
Kénogami
Chicoutimi
Jonquière
Lac Kénogami
Saguenay River
St. Basile
Eternity Cape
Trinity Cape
Tadoussac
Bagotville
Lac Tremblant
Lac Papamiskan
Q U E B E C
LAURENTIDES PARK
La Malbaie
Murray Bay
Baie St. Paul
Cacouna
Rivière du Loup
St. Lawrence River
Kempt Lake
La Tuque
St. Maurice River
Les Éboulements
St. Tite des Caps
St. Jean Port Joli
Ste. Anne de Beaupré
Lac Beauport
Montmorency Falls
Ste. Famille
St. Pierre
Quebec
Ile d'Orléans
Ste. Foy
Lévis
Beaumont
MONT TREMBLANT PARK
Lac Toro
Grand'Mère
Shawinigan Falls
Trois Rivières (Three Rivers)
Chaudière River
East Broughton
Thetford Mines
Chamberlain Lake
Lake St. Peter
Sorel
Drummondville
Warwick
Black Lake
Ham Nord
St. Rémi de Tingwick
Ste. Elizabeth de Warwick
Asbestos
St. Georges de Windsor
Mégantic
Chaudière River
Mont Tremblant
Ste. Agathe
Joliette
St. Calixte de Kilkenny
St. Jérôme
Montreal
Richelieu River
Richmond
St. Hyacinthe
Windsor
Stoke Centre
Ascot Corner
Sherbrooke
Granby
Lachine
St. Zotique
Valleyfield
East Farnham
Knowlton
Magog
Bedford
Stanbridge Station
Rouses Point
NEW YORK
Malone
Lake Champlain
St. Albans
VERMONT
Connecticut River
Newport
N. H.
Rangeley
Jackman
Moosehead Lake
Kennebec River
Dover-Foxcroft
Dexter
ONTARIO
St. Lawrence River
St. John River

Seven Islands
Sept Iles
Clarke City
Moisie
Mingan
Mingan Passage
West Point
Port Menier
Anticosti Island
Jacques R.
Godbout
Baie Comeau
Petite Madeleine
Rivière au Renard (Fox River)
Ste. Anne des Monts
Mont Jacques Cartier
Mountains
Gaspé
Cape Gaspé
Percé Rock
Bonaventure Island
Percé
Corner of the Beach
Mont Ste. Anne
Grande Rivière
Cap d'Espoir
Betsiamites
Matane
Shickshock
GASPESIAN PARK
Metis Beach
Ste. Flavie
Ste. Luce
Rimouski
Bic
Gaspé Peninsula
St. Charles de Caplan
Dalhousie
Trois Pistoles
Campbellton
Jacquet River
Baie de Chaleur
Caraquet
Bathurst
Chosen by Harry S. Oliver and Irvin E. Allaman
Edmundston
Fort Kent
Van Buren
Grand Falls
Caribou
Presque Isle
Woodstock
Houlton
Mount Katahdin
Millinocket
Danforth
Lincoln
Old Town
Bangor
Baffin Island
GREENLAND
Hudson Strait
Fort Burwell
Atlantic Ocean
Foxungnituk
Hudson Bay
Koonak River
Ungava Bay
Port Harrison
Fort Chimo
Belcher Islands
Kokatak River
UNGAVA
Hopedale
Burnt Creek
James Bay
Fort George
Goose Bay
Battle Harbour
Grand Falls
Blanc Sablon
Map Area
QUEBEC
Laurentian Mountains
Anticost Island
Noranda
Rouyn
Val d'Or
Bourlamaque
St. Lawrence River
Gaspé
Gulf of St. Lawrence
Newfoundland
Gatineau River
Quebec
Hull
Ottawa
Montreal
NEW BRUNSWICK
PRINCE EDWARD ISLAND
Baddeck
CAPE BRETON ISLAND
Sydney
NOVA SCOTIA
MAINE
Toronto
N.Y.
VT.
N.H.
Halifax
STATUTE MILES

Then François and his friends, men and women, seized partners among us strangers. The fiddle's tempo raced. The room became a blur of whirling couples. Heels drummed the floor in sharp rhythms of *Le Galop* ("The Gallop") and *Les Oiseaux* ("The Birds").

At Murray Bay I put my car aboard the Canada Steamships Lines' cruise ship, *Quebec*. It was a glorious trip down the St. Lawrence to Tadoussac (page 457) and up the awesome gorge of the Saguenay.*

A saffron sunset silhouetted the great capes of Trinity and Eternity. They bulk above deep waters stained by forest distillations to the hue of polished mahogany. Our ship reached Bagotville at dusk. We drove to Chicoutimi, business center of the fast-growing district.

Empire of Aluminum

From Chicoutimi we sped six miles west to neat, shady Arvida and the world's biggest single aluminum-ingot smelter. Here 8,000 workers of the Aluminum Company of Canada, Ltd. (ALCAN), produce about a quarter of all the aluminum made in the world.

ALCAN's Yvon Cousineau showed me the immense works and the mighty Shipshaw hydro station that powers it.

The plant covers 529 acres. Every day huge buckets carry nearly two million pounds of molten aluminum from electric furnaces to ingot molds.

Wartime demand for the critical aircraft metal vastly expanded facilities. To get enough power to heat thousands of new smelting pots, Shipshaw dam and powerhouse were built.

"The electricity used to make one ton of aluminum," said Cousineau, "would light your house for 14 years!"

We felt ant-size wandering around Shipshaw powerhouse.

"Every second 42,000 cubic feet of water drop 210 feet to whirl 12 turbines and generators," Cousineau stated. "The product is 1,200,000 electric horsepower, of which a million goes direct to the Arvida aluminum works. Shipshaw contributes a sizable chunk of Quebec's six million developed hydroelectric horsepower."

It took 47,000 men (including 700 Tremblays, 65 of them called "Joe") to build Shipshaw. Work went on day and night through two and one-half war years.

Price Brothers & Company, Limited, have been leaders in development of the Saguenay region for more than a century. We went out to Lac Kénogami to call on one of the company's veteran employees.

Adolphe Tremblay had fathered 15 children and had worked for Price Brothers for more than half a century; yet he carried his 68 years and 230 pounds lightly.

"Bonjour, bonjour!"

Tremblay gave, and we returned, the universal greeting of French Canada. Here, deep in the thinly peopled kingdom of "*le pulp*," future newspapers get their start in life as dense, dark forests of spruce and fir.

After a firm handshake Tremblay led the way to an old-fashioned garden swing. Our portly host eased himself into one creaking seat. His wife, plump and jolly as her spouse, settled back facing her man.

Below Tremblay's front yard the road from Jonquière swung out to a wharf where two chunky pulpwood towboats lay moored. The rumble of tumbling water drifted up from a dam at the foot of the bay.

"Mos' of ma life I spen' on de bush," Tremblay said. "Many year I drive de logs on de rivière. Long tam I been gran' foreman on charge all de woods operation on Lac Kénogami."

Tremblay folded hands across his ample paunch. He looked up the lake that wound like a silver river between wooded shores. The water was flat calm, and flat-bottomed clouds with cottony tops drifted lazily overhead.

Tremblay turned back to give me some vital statistics of his active life. Proudly he told us that in 1945 Price Brothers printed his picture on the company's New Year card.

But Tremblay didn't want his 55 years' service to give us the idea he was an old man. He explained that in this rugged country many men his age took care of their parents. He beamed at his wife and gave her full credit for being so good to him.

"Ah, oui! Sure t'ing," he said. "Ma femme, she nevair so 'appy like w'en she spoil me."

Tremblay's goodly corpulence bore stout witness to decades of spoiling, with rib-clinging potatoes and pork, blueberry pie, country cream and butter, and beans baked with plenty of pork.

Permanent Wave for Wood Pulp

Next day I talked with Dr. H. S. Hill, director of research for Price Brothers' big newsprint mills at Riverbend and Kénogami, and with Dr. J. Edwards, his associate.

Quebec Province, they told me, produced more than half the newsprint made in

* See "Gentle Folk Settle Stern Saguenay," by Harrison Howell Walker, NATIONAL GEOGRAPHIC MAGAZINE, May, 1939.

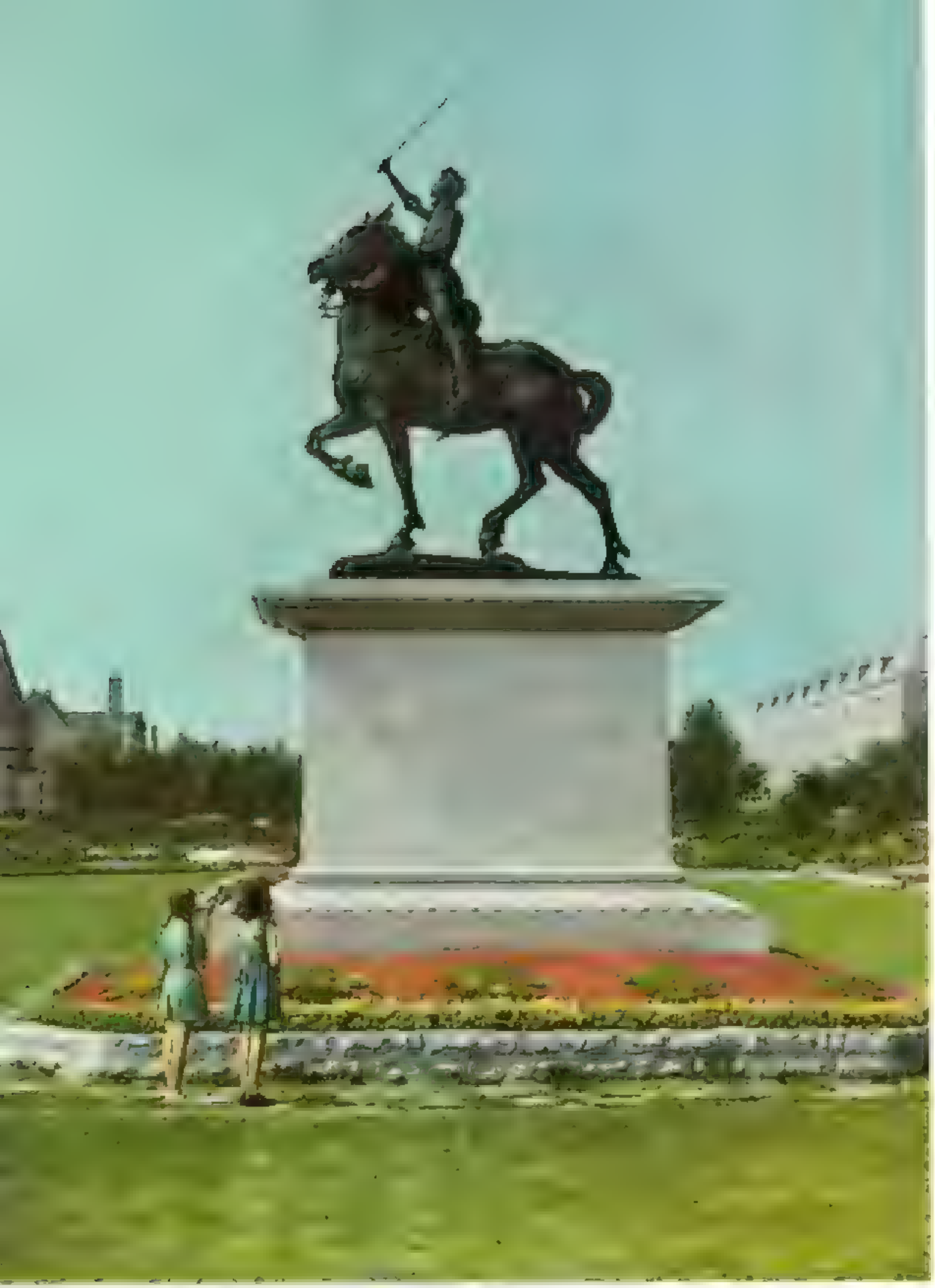
  Kodachrome by John E. Fletcher

Even Quebec's Capitol Has a French Look

Four out of five residents of the Province are of French origin; 81 percent are French-speaking. On the Parliament Buildings grounds, once an old cricket field, stands the statue of Honoré Mercier, a former premier.

Every Year Visitors from the United States Thrill to Quebec's Skyline, with Its "Trademark" Towering Chateau Frontenac

Steep, Narrow Streets Reach Out Like Tentacles from Place d'Armes, Hub of Old Quebec



Joan of Arc Rides on the Battlements of Where Henry Was Crowned from France

The Maid of Orleans is to be [illegible] castle on the [illegible]

Massive Gates and Walls Remind Visitors that Quebec Once Was a Fort

Narrow Cobbled Streets in Old Quebec Lead Visitors Back to the "Old World" Days

A Wave, a Shout and They're Gone: a Wind-swept Dust Bowl Crossroads in the

"Bonbons on Good Skates": Six Sexy as Christmas Beau Lies Her Laces

Carolina 'Scoop' Intercepts In Speed 'Sprint' In Dream Contest

Choir and Altar of Quebec's Basilica of Notre Dame Blaze with Splendor

Canada and about a third of the world's total output.

Dr. [illegible] previously [illegible] revolutionary new pulp-treating technique [illegible] they had named it, because it imparts a kind of permanent wave to wood-pulp fibers.

In the Bible Jacob served seven years for Rachel. Dr. Hill and his aides labored through seven long years of research and experiment before winning Curlation to their service. The work cost half a million dollars.

At the Riverbend mill I watched the first commercial Curlator treating a steady flow of sulphite pulp. (Sulphite and groundwood are blended to make newsprint.) By bending, kinking, and twisting the wood fibers, Curlation allows more complete utilization of the "cooked" sulphite pulp. Less wood goes down the drain as waste screenings.

"We've already obtained better than one-tenth more sulphite pulp per cord of wood," said Dr. Hill. "With the addition of new Curlator units we expect to be able to get 25 to 30 percent more pulp per cord. This will mean a saving of about 33,000 cords of pulpwood a year for our mills alone."

That represents a whopping wood pile and a big stretch of spruce and fir forest conserved.

Yves Coulombeau joined me on a trailer round Lake St. John. The lake is shallow and wide—25 miles in diameter. Dammed near the Saguenay River outlet, it's a reservoir conserving precious waters. Good farmlands, which grow crops of wheat, hay, clover, and oats, and support dairy industry, occupy the rim of the lake basin.

We stopped off at the Trappist monastery at Mistassini where monks practice modern methods in agriculture and stock and dairy management.

A jolly little priest, Father Georges, showed us the monastery. He chuckled continuously, as if our visit was delightful. We roamed quiet halls, nodding at black-garbed priests and brown-robed lay brothers. None may speak unless spoken to.

Moral Keys for Lockers

In the reading cloister we saw stalls for each priest and lay brother. Under every seat was a little two-doored cabinet for books and papers.

"Each man's book locker is secured with a special key," Father Georges informed us.

We saw knobs, but no locks or keys, and must have looked baffled.

"It's a moral key!" said Father Georges with merry relish.

The monastery dairy herd a wide variety of books, from theological tomes to modern travel volumes, and from geological reports to the NATIONAL GEOGRAPHIC MAGAZINE.

In the refectory Father Georges pointed out his place at table. Forks and spoons were of olivewood, made in France. Father Georges used the same fork issued to him when he entered Mistassini. Its tines were worn to stubs.

"How long have you been here?" I asked.

"Thirty years," he answered.

"Have you ever been to Roberval?" Roberval is 55 road miles away.

"No, no. Too far!"

An expressionless bearded brother was preparing tables for the next meal. Father Georges glanced at him and whispered:

"He was a combat commander, a major, in the recent war."

Quebec's "Attic" a Storehouse of Riches

Flying far north from Lake St. John, I saw how Quebec is cracking the shell of isolation from the empty four-fifths of her territory. Looking to her future, the Province counts more and more on opening up the top-heavy attic of her enormous living space (map, pages 436-7).

Spectacular finds have crowned wilderness explorations for iron ore, titanium, and base metals. Matched with the huge backlog of untapped water power and forest resources, these discoveries are sending development ideas soaring.

J. H. ("Red") Lymburner, who piloted Lincoln Ellsworth on a daring flight across Antarctica, runs Mont Laurier Aviation Company, Limited, based at Roberval.

Red sends his pilots out on all kinds of bush-flying jobs. They drop museum men on northern rivers to collect bear and caribou. They set down prospectors and surveyors in remote regions that are blanks on maps, and put ashore anglers on hard-to-get-to lakes.

Lymburner signed me up for a trip to the untamed hinterland.

Half an hour out of Roberval we left the last farm behind. We soared above the rumpled Canadian (Pre-Cambrian) shield that makes up about nine-tenths of Quebec Province. It's a region of old, old rocks, twisting with spruce forests and patched together with mossy swamps. A lacework of lakes and streams patterned the wide wilderness.

Six hours and some 700 miles north of Roberval, our pilot greased the PBY on to the swift Koksoak River. Canoes arrowed out from a prospectors' tent camp. Loading them was tricky as we fought prop wash and

surging river. The canoes swallowed gasoline, meat, fresh vegetables, canned goods, brooms, and axes.

Winging on to Fort Chimo, near Ungava Bay, we met Jacques Rousseau, director of the Montreal Botanical Garden, three other scientists, and their four Indian canoemen.

They had chartered our PBY to carry them across to Povungnituk on Hudson Bay. They would make a canoe traverse of bleak Ungava peninsula, studying plants and rocks along two river courses never before traveled by white men.

Fort Chimo airfield stands on the fringe of the northern tree limit. Next morning, early on our flight to Hudson Bay, the last spruce and larch trees dropped behind.

Across little-known Ungava peninsula lakes and shadow rivers meshed the flinty landscape, where nothing grew but caribou moss, dwarf willows, thin grass, and lichens.

Scientists Dare the Wilderness

Eskimos in white parkas waved to us as we spiraled down over the settlement of Povungnituk at the edge of the blue expanse of Hudson Bay. The pilot tipped the amphibian's nose toward the mouth of the Koggiuk River.

The expedition men piled dunnage into canoes and called "Au revoir!" They paddled ashore to set up camp. Weeks later in Montreal I met Rousseau again, safely back from his hazardous journey.

Five hundred miles southeast, almost at the center of the huge peninsula separating Hudson Bay from the Atlantic, they dropped me out on Knob Lake airstrip.

It was startling to catch sight of the raw scar of the runway after hours of flying over wilderness utterly devoid of any sign of humanity.

The earth air-strip was brick-red from iron in the soil. This was the vital metal—mile on of tons of it in near-by hills—that was the magnet drawing the needle of man's interest to this remote spot.

Quebec believes these fabulous deposits may be the answer to the iron shortage that looms as postwar steel demands cut into reserves of high-grade Lake Superior ore.

The new iron ranges straddle the Quebec-Labrador boundary, 525 miles north of the St. Lawrence River. To get the ore to St. Lawrence tidewater will require pushing a 360-mile railroad through uninhabited rock-and-muskeg wastes.

Late in 1948 the Labrador Mining and Exploration Company Limited, announced that its field staff had proved up 300 million tons of ore, enough to warrant costly rail and harbor [illegible].

At the airstrip I met Jules R. Timmins, the company's president, who had just ended an inspection trip.

"This iron development promises to be a great boon to Quebec Province," Mr. Timmins said. "We've gambled $5,000,000 on it so far. We're most hopeful the gamble will pay off, to the benefit of our companies, Quebec, Canada, and the United States."

All Equipment Air-delivered

Both Knob Lake airstrip and Burnt Creek base camp are in Quebec territory. The Newfoundland border is just "over the hill" to the south.

Burnt Creek camp (population 190) looked like a gold-rush town in a Hollywood western. As chief geologist Joe Retty showed me to the comfortable guesthouse, he said:

"Remember that everything you see here, from mattress to bulldozers, has been flown in."

We loitered before a crackling log fire while Dr. Retty briefed me on this new beat in the wild heart of Ungava.

"What we're doing now is tonnage drilling," he said. "With diamond and churn drills running 24 hours a day, we're taking the measure of the major ore bodies. So far, the ore's running better than 55 percent iron.

"I'll take you around the drilling locations in the morning. We've dozed out 80 miles of roads to link 'em."

Before I'd rounded out my tour of drill sites, adits, and test shafts, my clothes, hands, and face were rust-red with iron ore.

Next evening Norman Delmore, who runs the vehicle repair shop, drove me to a ridgetop overlooking the stark land. We were moved to silence by the space and freedom. There was solemn beauty in wooded valleys and moose hills reaching to purple horizons.

The sun sank in a burst of flame. Dozens of lakes reflected the afterglow. Far below, twinkling lights of the drills were like single bright stars fallen out of the clear night. Somehow those dots of light pointed up the emptiness of that stern country—lonely, aloof, but strangely haunting.

I flew out next day in a freight-hauling DC-3. Then it was bye for the Gaspé!

We got under way eastward through lush farming country.

Beyond busting Rivière du Loup stretched the resort reach of the lower St. Lawrence. Overheated Quebecois invade this cool coast in summer. They stop in Cacouna, Trois Pistoles, Bic, Rimouski, Ste. Luce, Ste. Flavie, and Metis Beach.

On both sides of the road [illegible] [illegible] [illegible] were fenced [illegible] [illegible] long strips of [illegible] and pasture. Old-time settlers along the river [illegible] among their sons so each would have a lot of water front.

[illegible] narrow widths, the farm [illegible] the road. The land was split up again for the next [illegible] [illegible]. Roads [illegible] [illegible] the road [illegible].

Gaspé—a Scenic Climax

At Matane we began the Gaspé tour. The hills crowded close to the gulf [illegible] between Ste. Anne des Monts and Rivière au Renard [illegible] River.

The road squeezed between [illegible] cliffs and lapping waves. It wound [illegible] to the mountaintops. It raced out to dizzy-making views far above the Gulf of St. Lawrence, then wound back into the hills.

Wherever a stream sawed the mountains a town [illegible] a few villages [illegible]. Farmers gave way to fishermen. Net-draped [illegible] and [illegible] [illegible].

Many [illegible] [illegible] from the interior where the Shickshock Mountains [illegible] the [illegible] of [illegible] [illegible].

[illegible] like [illegible] [illegible] on the Gaspé [illegible] [illegible] and [illegible] the Gulf of St. Lawrence [illegible]. The [illegible] [illegible] houses and red houses, [illegible], green, orange, [illegible] looked like [illegible] on Christmas cards. [illegible] were [illegible] with the smell of seaweed and fish. The narrow harbor [illegible] [illegible].

[illegible]

Who Wouldn't Be Proud of a Loaf Like That?

[illegible]

We met [illegible] [illegible] the [illegible] of the town, was [illegible] by [illegible] [illegible].

The [illegible] [illegible] [illegible] French Canada. [illegible] such dwelling [illegible] [illegible] and God [illegible].

We entered by the back summer kitchen, passed through the winter kitchen, then the dining room, [illegible] in the [illegible] parlor. Religious pictures hung on the walls. A [illegible] organ stood in the corner.

The Tapps, though descended from English stock, spoke no English.

"I've fished for 45 years, since I was 10 years old," Phileas said. "A hand line has always been good enough for me—no nets. I build my own boats and I built this house.

"I've only one son but eight daughters. The daughters bring me more sons, though," he added, smiling at son-in-law Willie, who sat at Phileas's left.

"For 22 years I was the best fisherman on the coast with my brother. He drowned when a tempest overturned our boat. I was lucky to hold on to some bits of wreckage."

Phileas smiled again, saying, "Now for two years I am the best fisherman on the coast with my son."

Icy Water and Burning Sand

We went on to Gaspé, chief town of the region. Near here in 1534 Jacques Cartier set up a cross claiming the area for the King of France.

Gaspé town is terminus of Quebec's easternmost railroad, the Gaspé branch of the Canadian National Railways. That line serves the south shore of the Peninsula.

The sun beat down hot as we skirted bays and beaches of the tip of Gaspé. To cool off we plunged into tumbling water near Corner of the Beach. Burning sands thawed us between dips as we listened to wavelets lapping the beach with a sound like tearing silk.

A few miles farther, over steep, forested hills, glorious Percé swept into view.

"There you are!" enthused Claude Melançon, our genial travel companion. "The Perron Boulevard is a golden belt circling the Gaspé. Percé forms the shining buckle!"

The famous village carved between green fields and blue sea. Just offshore, its sheer cliffs rose in the sun, rode the great Pierced Rock (*Rocher Percé*) that names this place (page 455). Waves have worn an archway through the south end of the rock. Beyond lay Bonaventure Island, site of a famous gannet rookery (page 453).*

Percé Rock is a treasury of fossils. The American geologist, John Mason Clarke, estimated that more than four *hundred million* fossil trilobites and brachiopods, little marine animals, are locked up in the monolith.

From La Normande Hotel we explored Percé. We climbed the red cliffs of Mont [illegible]. At low tide we walked across [illegible] Pierced Rock. We watched gulls in thousands fly up the beaches where fishermen cleaned their cod.

Prominent French-speaking people summer at Percé. We went on a picnic with Léon Lortie, noted professor of chemistry at the University of Montreal.

Dr. Lortie told of sharing an airliner seat recently with a Sister of Ste. Anne. After more than 20 years at a mission station in the Far North, the good woman was on her way to visit her family in Lachine, near Montreal.

"Though elderly, she was still full of pep," Lortie said. "She told me about an old godless prospector, attacked by Lady Luck, who stumbled into her hospital to die.

"The Sister asked him to pray. He knew no prayers and felt they were useless anyway. Undismayed, the Sister told her faithless patient to repeat after her, 'Mon Dieu, je t'aime beaucoup' ('My God, I love you very much.)

"The grizzled relic of the trails heard 'Mon Dieu' as 'Mon vieux' ('my old friend'), and snorted, 'Well, if you love me, why don't you kiss me?' So she did!"

As we drove southwest from Percé along the Gaspé coast, Claude pointed out a [illegible]

"That's Cap d'Espoir," he said. "In English it means 'Cape of Hope.' Early British navigators paid heed to the name's sound but not its sense. They called it Cape Despair!"

At Grande Rivière we stopped at the Laval University (Quebec City) fishery station, a lobster hatchery and laboratory for study of the cod fishery.

Cod Swallow Rocks for "Ballast"

"A big cod is so voracious he'll eat anything bright," Jean Louis Trembley, the director, told us. "That's why fishermen catch him so easily even on a shiny piece of lead with hook attached.

"We've taken a bunch of keys, a broken spoon, a watch, and a bottle top from cod stomachs. Cod love bits of wave-worn glass. We caught one that had gulped down a piece of a wine bottle. A scrap of label on it gave the name of the Atlantic liner that threw it overside.

"The greedy fish pick up glistening rocks in quantity. Fishermen say that when the cod sets out on a long journey, he takes on ballast."

In the little town of St. Charles de Caplan we called on Father Georges Hermel Roux, priest of the parish, who has organized a highly successful agricultural cooperative. Last year *La Fraternité Coopérative* did $275,000 worth of business. It sold turkeys,

* See "See, Bird Cities Off Audubon's Labrador," by Arthur A. Allen, National Geographic Magazine, June, 1945.

strawberries, lettuce, eggs, and dairy products.

Driving at a wild pace around the town, Father Rioux took us to see the big new refrigerator plant and flour mill.

Back in his study, he told us, "We have a stake in our people's intellectual as well as material success. I've organized a Study Circle. The response has been inspiring. We discuss everything from science and history to philosophy and morals.

"By necessity, I lead most of the meetings. Tonight I'm talking about gases, how it's made and what it's used for. While I do most of the talking about science and history, I get our agronomist or the Cooperative manager to discuss morals and ethics.

"The people listen more attentively to laymen on these subjects. I guess they feel a layman has no special spiritual ax to grind."

Off for Quebec's "Golden West"

We sped on west past the Cascapédia, Restigouche, and Matapédia Rivers, paradise for salmon anglers. We kept on, clear across the Province. I had a date in the gold district of western Quebec, 450 rail miles northwest of Quebec City.

There's nothing gentle about the country around Val d'Or, Bourlamaque, and Rouyn-Noranda. Forest fires have crackled over hundreds of square miles.

Gray banks of mine waste engulf woods and black ponds. Rock reefs, stripped of trees and soil, hide nakedness in firewood and poplar. Sun-bleached headframes and sloping conveyor ranges are mine landmarks.

A neighbor across the car aisle spoke to me. "Sure looks desolate," he said, "but it's the finest kind of blueberry land."

The speaker, G. R. (Ted) Provencher, and his partner ship 160 carloads of refrigerated blueberries a year from western Quebec.

"We hire hundreds of berry pickers," he told me. "They take their whole families out into the bush to a good spot, set up camp, and make a sort of picnic of the job. Even counting what goes into mouths instead of boxes, we probably don't take out more than a tenth of one per cent of the available fruit."

Only 25 miles from the Ontario border I stepped off the train at Rouyn-Noranda. Gray smoke plumes flew from the twin 422-foot stacks of Noranda Mines, Ltd., biggest copper producer in Quebec and third largest in Canada.

"This is a copper-mining and smelting operation, and copper is our most important product," manager R. A. Purdy told me. "Yet we produce more gold than any other mine in Quebec."

Noranda Mines' shafts reach 6,000 feet below the surface. In 1948 43½ million pounds of copper came out of those depths.

At the mines of Senator-Rouyn Limited, manager J. C. Houston handed me one of the gold bricks his mine lives on.

"That's a loan," he said with a laugh, "for as long as you can hold it without sitting down."

It was a chunk of gold weighing 88 pounds. If I'd had a notion to run off with that mighty nugget, I'd have been a police prize worth more than $42,000!

From 600 tons of ore treated every day Senator-Rouyn recovers only about one-sixth of an ounce of gold for each ton of ore.

Houston saw me prick up my ears at a worker's foreign accent.

"That's a Pole," he said. "Over 2,000 displaced persons from Europe, many of them Poles, have come into Canadian mining during the last year. We've taken on twenty and found them capable, ambitious workers. Some of them turned up wearing old United States Army uniforms, dyed black and minus the brass buttons. They'd probably traded the buttons for shoes or bread."

This tortured, elemental land has yielded riches far surpassing the haul of Spanish galleons. In 1948 alone western Quebec produced $61,605,431 worth of gold, silver, copper, zinc, lead, selenium, pyrite, and molybdenite. Gold accounted for $26,900,055 of this total and copper for $21,819,473.

Asbestos Is Top Mineral

In Quebec's Eastern Townships, the area east of Montreal between the United States border and the St. Lawrence River, I learned that neither gold nor silver, neither copper nor zinc, ranks first in value among Quebec's mineral products. At the top of the heap [illegible] fibrous, heat-hating asbestos.

Every year asbestos finds new uses; yet Quebec still supplies more than two-thirds of the world's requirements.

Quebec's gaping open pit asbestos mines in the Eastern Townships suggest volcanic craters. Colossal holes in the ground at Thetford Mines, Asbestos, Black Lake, St. Rémi de [illegible], and East Broughton in 1948 produced 746,769 tons of the versatile mineral fiber.

In the Eastern Townships, textile and manufacturing centers such as Sherbrooke, Magog, Granby, and Drummondville [illegible] settled and named by English folk. Now they're growing more French every year.

Many of the places sound like south-of-England towns: Warwick, Richmond, Asco

Cotnoir, Knowlton, Bedford, East Farnham, Stanbridge Station, and others. As Frenchifying takes place, their names get a Gallic twist: St. Georges de Windsor, Hun Nord, Stoke Centre, Ste. Elizabeth de Warwick.

Villages here resemble those of New England. Elms and maples shade brick and clapboard homes and shops.

Pastoral Ile d'Orléans

I returned to Quebec City and went out to green and peaceful Ile d'Orléans (page 456).

We admired fine old Norman cottages, with their concave bell-cast eaves built on the brink of bluffs overlooking the St. Lawrence. At Ste. Famille we paused at the oldest inhabited house on the island. It was put up 275 years ago.

Outdoor ovens used to be a common sight in rural Quebec (page 449). This house has a built-in brick oven in the kitchen.

From Ile d'Orléans we whisked along the new Quebec-Chicoutimi road to wooded uplands of the Laurentian Mountains. The air was tangy with the perfume of sun-steeped spruce. White-throated sparrows trilled their sweetly plaintive call, "Oh, oh! Canada, Canada, Canada!"

In these lake-dotted hills the Province of Quebec has set aside the Laurentides Park. It's a game preserve and angling paradise bigger than Yellowstone National Park.

We spent three memorable days at Lake Sept Iles (Seven Islands) Lodge, one of 16 comfortable fishing retreats within the park. By corduroy road, portage path, and canoe we reached lakes where loons laughed and brook trout leaped for the fly (pages 460, 461).

Driving along a road stretch still under construction, I caught sight of a big bull moose nonchalantly munching roots in a swamp hazy with dust from passing trucks. Instinct seemed to tell him that, as long as vehicles kept moving, he was safe!

From Quebec to Montreal we followed the real "Main Street" of the Province, the St. Lawrence River.

Shipping churned the great stream. Low-slung tankers labored against the current, inbound to Montreal and the Great Lakes. Fat freighters slipped down river, high in ballast or low with wheat.

Red spar buoys bobbed and rolled in the restless waters. Church steeples and high-tension towers topped green fields, groves of elms and willows, and rows of planted poplars.

The riverbanks, steep near Quebec, flattened out upriver. Halfway between the Province's two chief cities we came to Trois Rivières.

Here the St. Maurice River pours through three mouths into the St. Lawrence. There we saw a cluster of huge newsprint mills, turning out hundreds of tons of paper every day. Most of it goes into American journals.

Pulp and papermaking, fed by the yield of vast spruce and fir forests, is the first industry of Quebec Province. In 1948 Quebec produced 2,696,638 short tons of newsprint. Value of pulp and paper products shipped through Quebec ports to the United States reached $160,959,775, all paid in precious American dollars (pages 462, 463).

A 20-mile detour to the edge of the Laurentian hills brought us to Shawinigan Falls. The harnessed cataract runs paper mills and aluminum plants. It also powers the cellophane, caustic soda and chlorine, and chemical works of Canada's largest chemical products firm, Canadian Industries Limited, known as C-I-L.

Generators flash electricity, too, to calcium carbide, acetic acid, Vinylite plastic, industrial chemical, and stainless-steel and alloy plants.

An hour and a half southwest of Trois Rivières traffic thickened. Cross streets and stoplights slid past. Broad Sherbrooke Street gathered us up. We were in Montreal.

Montreal—Canada's Chief Metropolis

Canada's largest city is a center of tall buildings, tempting restaurants, and bilingual achievement.

Counting in suburban towns, the population of greater Montreal is a million and a quarter, making the city the second largest (after Paris) French-speaking place in the world. About 20 percent of its people speak English as their native tongue.

Water-borne trade built the town. It is downstream terminus of Great Lakes freshwater traffic and, also the head of ocean navigation. Last year more than a thousand oceangoing ships cleared its harbor, although it is a thousand miles from the sea and icebound from December to April.

Montreal is the Dominion of Canada's chief financial, commercial, and industrial center. Its Sun Life Building is the largest office building in the British Empire.

This metropolis is one of the world's leading grain-shipping seaports and is the largest fur market in Canada. Astride 37,526 licensed bicycles, economical Montrealers ride to work and pleasure.

The University of Montreal, with mostly French-Canadian enrollment, and McGill University, in the main attended by English-

Half-tracks Haul Ten-ton Loads of Asbestos, Mineral That Helps Make Driving Safe

[illegible] asbestos and also for wallboard [illegible] open pit at Thetford Mines [illegible] The hill in [illegible] is waste rock dumped [illegible] mines

speaking, students between them instruct [illegible] Montreal [illegible] refuses [illegible] called it the [illegible] Corridor.

Ice Hockey, Favorite of a Skating People

The annual car[illegible] on St. John the Baptist Day is a highlight of the Montreal year. [illegible] "St. Jean Baptiste" is the festival of the patron saint of French Quebec. [illegible] falls on June 24 and is the patron holiday in the Province.

In Montreal, as throughout Que[illegible] ice hockey, the national [illegible] frenzy of enthusiasm which [illegible] matched, perhaps, is baseball's World Series. During the long winters Montrealers flock to their vast forum to cheer on their puck-and-stick darlings, the Montreal Canadiens [illegible]

Les Canadiens have won the championship of the professional National League in two of the last six play-offs. Both United States and Canadian teams make up the [illegible] Most [illegible] players [illegible] Canadian ice rinks.

[illegible] Montreal visitors, I climbed

Mount Royal. Its crest commands a wide view over the city and the silver St. Lawrence. How four centuries have changed this scene!

Jacques Cartier in 1535 ventured as far as Hochelaga, the Indian village on the Island of Montreal. Scaling Mount Royal, Cartier looked out with pleasure on a green and fertile land. Perhaps the peaceful vista stilled his disappointment that swift St. Lawrence rapids had shattered his dream of a western passage to the Orient.

English-speaking Quebeckers hold high office in industry, transportation, and mining. In education, retailing, and journalism, Montreal is headquarters for many of them. Americans have joined English and French Canadians investing millions in the Province of Quebec, which still offers the opportunities of a frontier land.

English and French Words Mix

[illegible]

Hand basin faucets marked for French users cost me scalded fingers. I turned the handle labeled "C," expecting cold water. Instead, boiling water and steam gushed out! Too late, I realized "C" stood for *chaude*, meaning "hot." The other faucet bore an "F" for *froide*, "cold."

Some hotels solve the bilingual hazard with faucets marked with stop-and-go dots of red and green on hot and cold taps.

The Quebecois is proud to be known as a French Canadian. In 1948 he officially unfurled his provincial flag, the *Fleurdelisé*, a white cross on a blue field with a white fleur-de-lis in each corner. By a big majority, also in 1948, he re-elected the aggressively pro-Quebec premier, Maurice Duplessis.

Yet the citizen of Quebec holds himself in unshakable allegiance to Canada, his Mother Country. The Canadian red ensign waves everywhere in Quebec, often side by side with the new provincial standard.

Quebec reflects strengthening economic bonds between Canada and the United States. And, like the whole Dominion, Quebec lives inevitably in the American way of modern movie houses, soft drinks, and banner-bright filling stations.

Quebec Lures U. S. Travelers

Almost despite itself, the Province has succumbed to the allure of gleaming refrigerators, budget dress shops, lavishly stocked drug-stores, and increasingly—self-service "groceries."

United States travelers spent more than $90,000,000 in Quebec last year! The Quebecois can't be blamed for wanting to make the wandering Yankee feel at home. A great many of the Quebecois hoist the Stars and Stripes just because they like Yankees.

What strikes these visitors, as it struck me, is the all-pervading *Frenchness* of Quebec, a character that asserts itself despite all the pressures of English-speaking neighbors.

In the shaping of this Gallic personality no force is more potent than the Roman Catholic Church which maintains an impressive hold on the people of Quebec.

This Church, of course, has been the French Canadians' rallying place from the very beginning. Explorer-priests carried God's Word into the wilderness. The church spire is the landmark of almost every Quebec village.

Roughly half the Province's French-Canadian people are named "Marie" and half "Joseph." Catholic girl children born in Quebec almost without exception are baptized with the first name Marie, in honor of the Virgin Mary. Boys are nearly all named Joseph, after the husband of Mary. Distinctive civil names come second.

Hundreds of Quebec town names honor saints. In the official Postal Guide of Canada I counted 606 Quebec post offices named after saints, from St. Abdon to St. Zotique and from short ones like Ste. Foy to mouthfuls like St. Calixte de Kilkenny!

Cling to the Old and Welcome the New

Quebec's typical Marie and Joseph bring up little Celeste, daughter of the Province, to cling passionately to ancestral language and traditions. Yet she shares, more and more, common customs with her Canadian sisters and American cousins who speak English.

She likes *chiens chauds* (hot dogs). She happily watches Hollywood double features. And she and her mother count Monday blue no longer, with the help of an automatic clothes washer.

The pace of life quickens in this movie-and-machine age. But the Québecois, jealous of their leisure, refuse to sacrifice precious hours dedicated to play and prayer.

Claude Mehagan told me: "We French Canadians have a secret. We always stop off along the way to enjoy life. We're willing to go without automobiles, if we must. But we won't go without a little time for fun and a little time for God—every day."

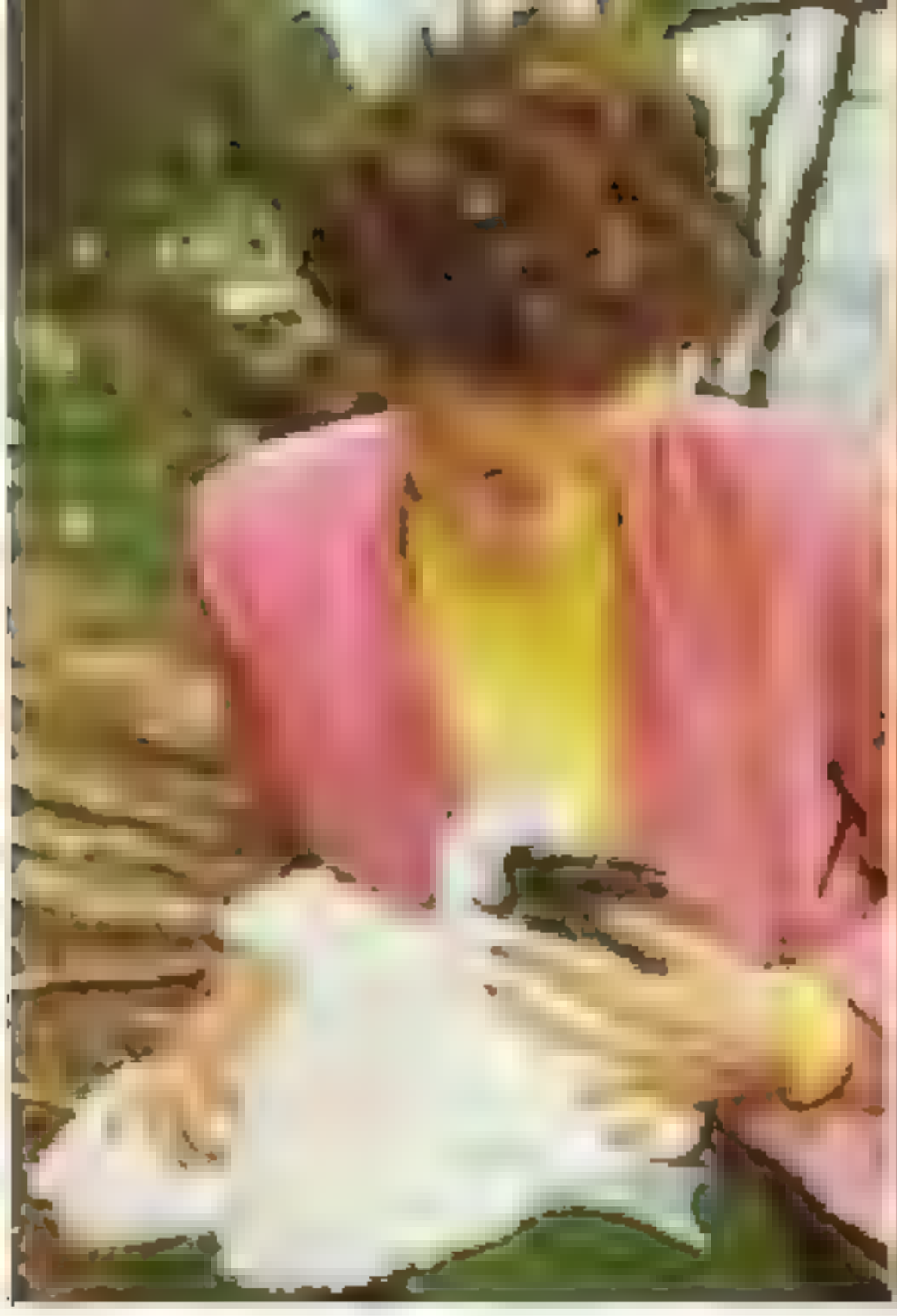
Lake a Phantom Ship Incised in Mist Force Rock Hoarse Blue Summer Sun

Lorenzo Delleani's Oxen Drove Their Slow and Steady Wagon into Memory. Delleani Spent his Life

Cannonies Have Brought Lock Changes to Powerful Tadoussac — A Cruise Ship Docks Where Jacques Cartier Landed in 1535

Women Remained Near, They Wait for Their Men To Come Home from the Sea

[illegible]



• Girl Crocodile Baby Gramer Adult Birds Right Are Nests Dinosaurs

• Fisherman Pigeon Hat [illegible] and Dressing for the Blessing of the Boats

Expert Guide Meloreen Catches a Pound of Trout in 15 Minutes

[illegible]

A Conscious Strain at the Paddles Racing to the Rendezvous

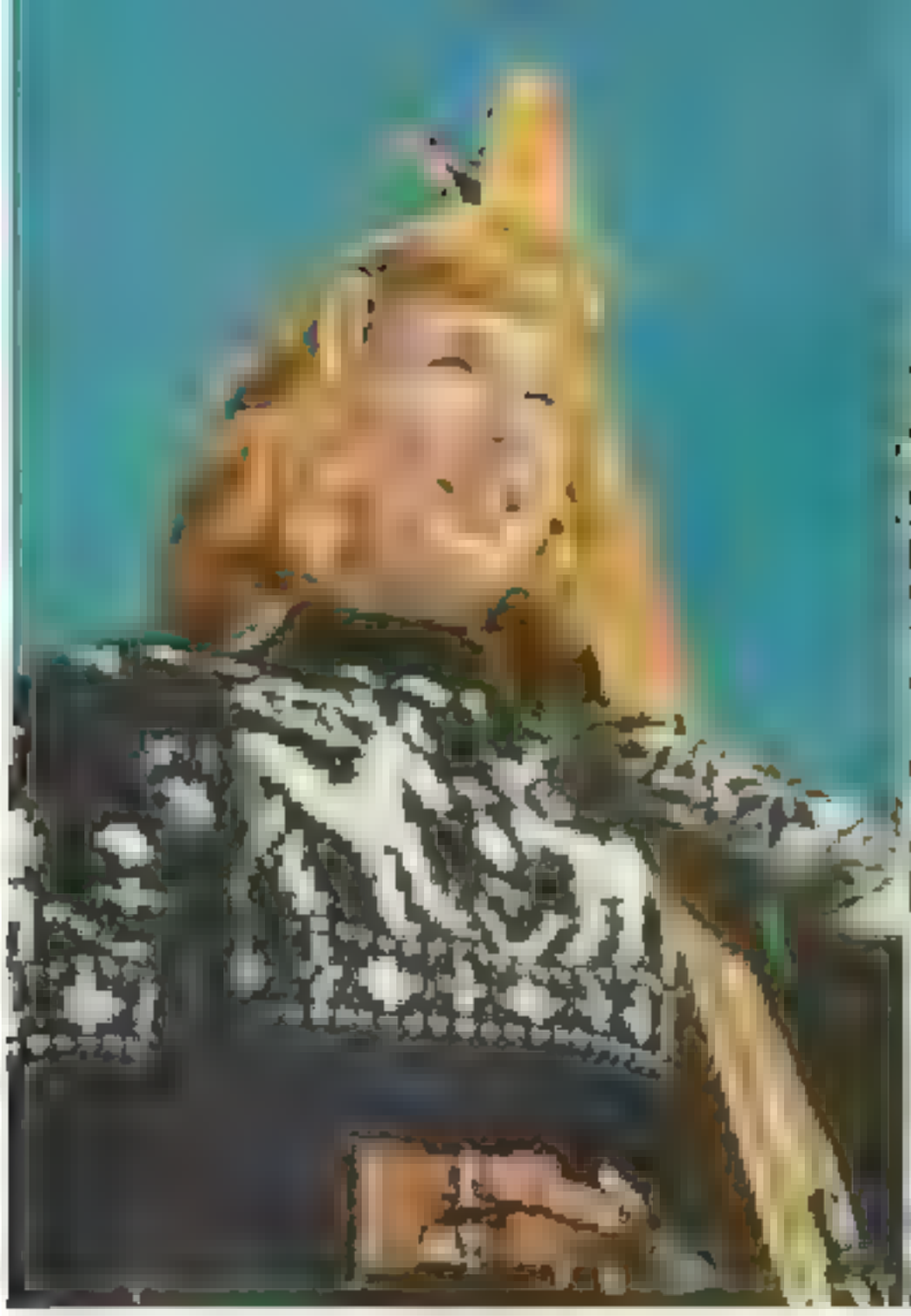
[illegible]

Ans Second: Jumping From Mrs Sharp's This Reflection in Lac Lamont

Fire Hydrants with "Water Guns" Spray a Mountain of Burnt Pulpwood at Quebec To Guard Against Fire During Drought

Sudbury is a Thousand Miles Headstrong as a Bronco Herd, Resistless as Stampeding Steers. That's a North Country Log Jam

Fresh Snow Wonders Crave—and Seek! But Who Wants To Hurry Through Fairyland?



Snow Workers Dig the Driest Moon
Snow Blies on a Damp Farm

Ice Blocks Wall a Crazy Corpse Free of
World of Fog or Sun

Pioneer Couple Real Berries from Lowland Strawberry Patches. Wrecked-crowned Hats Ward off Her Son

[illegible] Hurt's Two-and-a-Half Pounds, Madame A Lady Picked up Bar Perk[illegible]

[illegible]

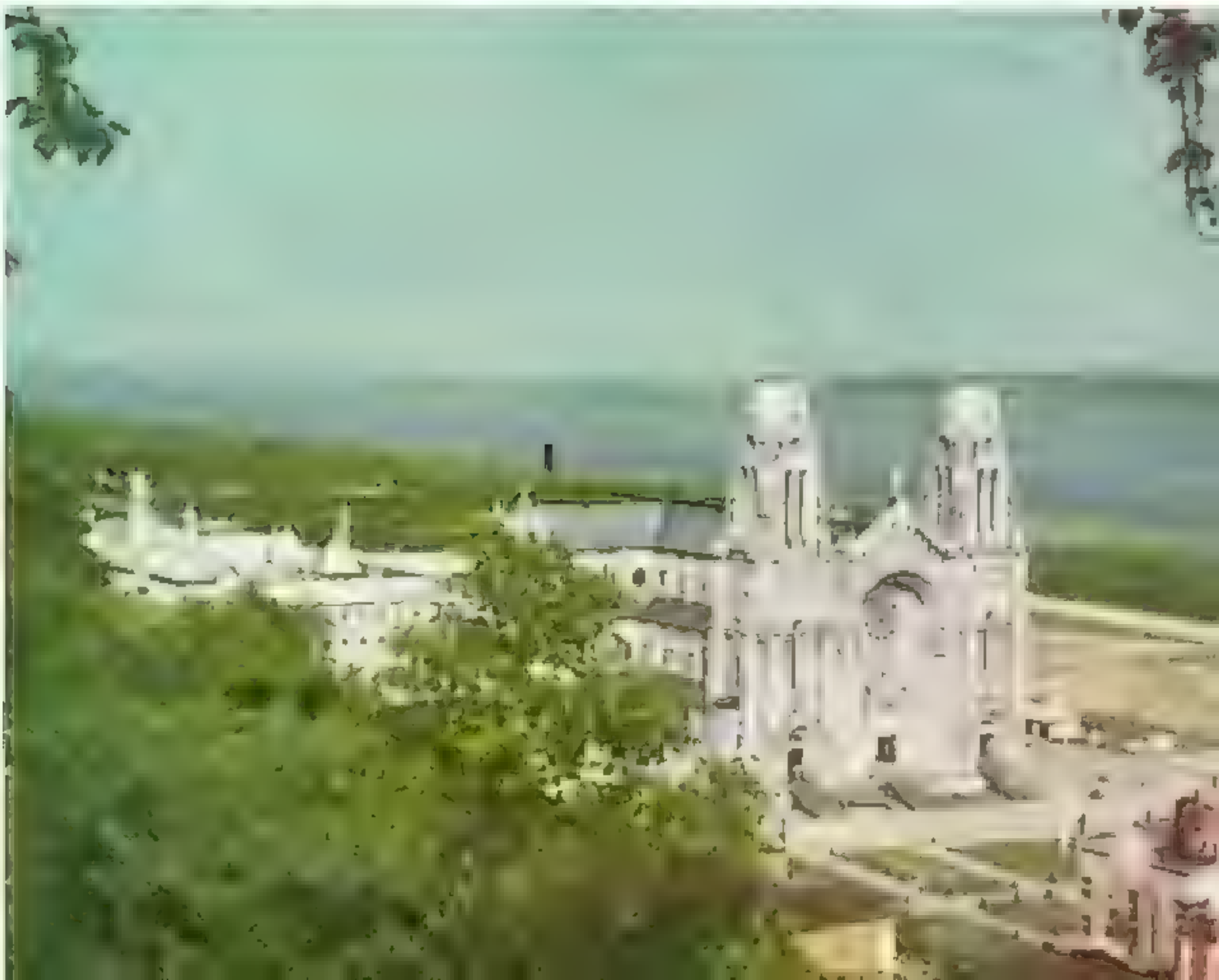
A Former Pots[illegible] Refractory Pig Out Lion Among

[illegible]

In a Stage at Spouts Juan, Montmorency Tumbles 265 Feet to the St. Lawrence

Dogs and Horses Still Earn Their Keep in Old Quebec

Pilgrims Arriving to St. Anne de Beaupré Mass Seeking Cure by Miracle



The Stripes of Tiffany Jones and Carves Out a Foothold for Himself

[illegible]

She Works at Her Desk in Quebec's Hustling Boulevard Revues

[illegible]

Nomads of the Far North

By Matthew W. Stirling*

Chief, Bureau of American Ethnology, Smithsonian Institution

At the beginning of the 16th century a meager 300,000 hardy nomads constituted the entire native population of the far north, an immense area comprising Greenland, peninsular Alaska, and all of Canada save the southern and far-western parts.

These people lived off the country, defying winter storms and temperatures that sometimes went to 60° F. below zero or more; building homes of bark, skins, or snow; clothing themselves with fur; eating game and fish—in short, adapting themselves to Nature in its harshest moods.

Paintings Combine Art and Research

In the 16 paintings which follow, W. Langdon Kihn has pictured them as they lived in the early days and as some of their descendants still live. He has painted them in traditional attire and characteristic surroundings, consulting old drawings and copying original costumes and implements.

Among these people only three major linguistic stocks are represented: Algonquian, Athapaskan, and Eskimauan.

Algonquian,† spoken by such tribes as the Micmac, Naskapi, Montagnais, Chipewyan, and Cree, extended from the Gulf of St. Lawrence to the Rocky Mountains in southeastern Alberta, where it was spoken by a Plains tribe, the Blackfeet.

Athapaskan was used throughout the great drainage basins of the Mackenzie and Yukon Rivers. Characteristic Athapaskan tribes were the Tanana, Kutchin, Hare, Yellowknives, Nahani, and Slaves.

The Chipewyan, Caribou-eaters, and Beaver, due west of Hudson Bay, lived more like their Algonquian neighbors to the south; the Sarcee were essentially a Plains tribe; and the Tahltan, Sekani, Carrier, and Chilcotin of the western Rocky Mountains reflected the culture of the northwest coast tribes.

Eskimauan was spoken along the entire Arctic coast, including the Arctic archipelago, from Yakutat Bay, Alaska, to Newfoundland. Beothuk, the curiously isolated aboriginal language of Newfoundland, has been extinct for more than a century.

The Algonquian region of the North is an extension of the Eastern Woodlands culture area. Probably its nuclear group was the Chippewa living in the western Great Lakes area, whose influence spread northward.

It is a region of forests, lakes, and rivers with no high mountain ranges. The Indians are migratory and live by hunting and fishing.

The Athapaskan area has many lakes and rivers but is somewhat more varied. In the west it incorporates the northern extension of the Rocky Mountains.

The central Athapaskan area, drained by the Mackenzie, is a flat or rolling country, heavily forested, with spruce, pine, birch, and poplar. The winters are long and severe, although snowfall is not heavy. The summers are warm and comfortable, but plagued with biting flies and mosquitoes. The most important game animal is the caribou. Moose and bear are fairly abundant, as are numerous small mammals.

Northeast of this forested area lie the Northern Plains, or Barren Grounds, summer grazing ground of caribou and parts of it a home of the musk ox. This bleak, frozen desert extends 2,500 miles from the delta of the Mackenzie River to Labrador.

The Indians now penetrate the Barren Grounds in the summer in search of skins and furs, but the territory is predominantly Eskimo.‡ The drainage basin of the Yukon is similar to that of the Mackenzie in many respects, but is more mountainous. Wildlife is similar, and salmon in season are important to the native economy.

The terrain occupied by the Eskimauan stock is a region primarily of seacoast and tundra, and largely treeless and frozen throughout

* This is the seventh in a series of authoritative articles by Dr. Stirling on the American Indian illustrated with W. Langdon Kihn's paintings. Mr. Kihn, a distinguished painter of Indian subjects, was commissioned by the National Geographic Society to illustrate the comprehensive series on American Indians. To gather data, he traveled to Indian reservations, excavation sites, and over areas populated by Indians long before the white man came, noting costumes, customs, scenic backgrounds, utensils, and ornaments of the tribes concerned. Thus the paintings combine artistic beauty with a wealth of accurate information. See, in the National Geographic Magazine, "America's First Settlers, the Indians," [illegible] January, 1946; and "Indians of the Far West," [illegible] 1948.

† The Algonquian linguistic stock takes its name from the Algonquin, one of the numerous tribes speaking this language.

‡ See "Canada's Caribou Eskimos," by Donald B. [illegible] 1947.

Except for the Tent, This Snowshoe Village Could Have Been Photographed in Ancient Times

most of the year. This severe environment presented a challenge which the Eskimo had to meet or die (page 495).

Typical of both the northern and western Athapascan tribes were the Kutchin, who lived in the region between the upper Yukon and the lower Mackenzie Rivers. Formerly they were called Loucheux. They are divided into eight groups whose customs differ only in minor details.

The major part of Kutchin territory lies north of the Arctic Circle where in winter temperatures around 50° F. below zero are not uncommon. The summer climate is by comparison extremely warm, sometimes as high as 90° F.

In addition to the large mammals hunted throughout Athapascan territory, such as caribou, moose, and bear, mountain sheep are found in the western part. In the spring and summer birds, including many varieties of waterfowl, are abundant. Fur-bearing animals, especially muskrats, are numerous in the sloughs and swamps of the lowland areas.

On the headwater streams of the Yukon, salmon are a source of food, while whitefish are of greatest importance to the tribes inhabiting the drainage area of the Mackenzie River. Many other species also are taken.

Tribes Fish in Summer, Hunt in Winter

In the early summer months the tribes fish for food. They hunt mainly during the winter and late summer. Fish on migration are taken in the rivers in nets or in basket traps. Large lake trout weighing up to 30 pounds are caught with hooks in all seasons.

What the bufflo was to the Plains tribes the caribou is to the Indians of the far north. The Kutchin usually take caribou by means of a large circular corral with a funnelike entrance having extended wings. The extremities might be a mile apart (page 498).

This type of hunt is a community venture. Throngs of Indians howling like wolves drive the herd into the entrance of the pound. When the animals are in the enclosure, the hunters block the entrance and shoot them with arrows as they attempt to escape.

Individual hunters stalk both moose and caribou with bow and arrows or capture them in snares. In this type of hunting the Indians display a remarkably intimate knowledge of the habits of the animals.

Magical aid was normally sought by the hunter. A common method, also practiced in parts of Asia, was to use the shoulder blade of a caribou on which were incised images of the animal. This was then held over a fire until cracked by the heat. The cracks then indicated the directions in which good hunting would be found and also presaged whether the luck would be good, bad, or indifferent.

No tree fruits exist in Kutchin territory, but several varieties of berries are abundant in the summer, as are certain edible roots and tubers.

When large quantities of meat or fish are procured in the summer, they are dried on racks and smoked. Then they are stored in baskets of birch bark, tightly packed with dried and pounded berries and kept for lean seasons. In winter Nature has provided a natural deep-freeze. Meat is cached in pits dug into the frozen ground.

Normally food is cooked in containers of bark or skin filled with water. The water is brought to a boil by the addition of hot stones.

The costumes of the Kutchin men were tailored from dressed caribou skin and resembled somewhat the dress of the Eskimo. The coat had a pointed tail both in front and behind and was decorated with fringes along the edges.

Further embellishment was embroidery made from porcupine quills dyed in different colors and from rows of Dentalium shells. The trousers sometimes were in one piece with the moccasins; sometimes the moccasins were detached. In winter a hood was attached to the coat.

The clothing of the women was similar, excepting that usually the coat was more ample to allow the baby to be placed under it, and there was no tail in front. Detached mittens were worn in cold weather, fastened to a line passed over the neck (page 479).

Porcupine Quill Embroidery a Fine Art

The finest porcupine-quill embroidery in America was that of the Athapascan tribes, and it is probable that the art originated among them.

The typical winter shelter of the Kutchin and their neighbors is a gable-roofed log house made by setting up logs vertically for the walls and laying them horizontally for the roof. The roof is made weatherproof by the addition of moss and turf. The door is provided by omitting a few upright logs at one end and hanging a skin over the opening.

When the Kutchin are on the move, they live in dome-shaped structures made from converging poles covered with skins. This is a variation of the commoner conical tepee used among the tribes to east and south. The northern tepee is covered sometimes with skin and sometimes with bark and is not so tall and steep as the familiar Plains Indian structure.

To Lace Snowshoe Frames, a Montagnais Uses Moose Hide

The tribe and the relative Naskapi were skilled at this handicraft, making [illegible] some long and narrow, some flat, some with pointed toes (pages 4 8 and 480). On Pointe Bleue Reservation, Quebec, this provident Indian prepares in summer the equipment he will need to work his trap line several hundred miles to the north.

When a new camp was selected, the men arriving first, awaited the coming of the women with the tepees and camp paraphernalia and then hunted around while the women set up the camp.

Women were held on a par with their husbands in deference.

Strangely enough all the cooking was done by men. The men, upon the first selecting the choicest items for themselves and throwing what was left on the ground for the women.

In early days mothers frequently killed female children to spare them the hardships of a woman's life.

Although game was abundant at times, there were often periods of want and famine. Old people, sick or no longer able to care for themselves, were frequently abandoned by their families in the wilderness.

The Kutchin used a peculiar type of cradle in the form of a bag [illegible] with a [illegible] rest, in which babies were carried in a sitting position (page 479).

When they traveled, the Kutchin use a sled [illegible] with [illegible] runners. On these is constructed a built-up platform. The sleds are drawn by the women. Dogs are not used for this purpose.

The lot of the women was harder than among most other Indian tribes.

In addition to hauling the heavy loads when moving camp, the woman had to [illegible] the game killed by the male hunters and bring it to camp. She dried the meat in summer, made all clothing, dressed skins, repaired snowshoes and performed virtually all of the camp duties.

Most of the northern tribes did not use a [illegible] skin sack with a lining of moss which could be changed frequently. This practical device was adopted by the wives of many of the white traders who lived in the north woods (page 477).

Chiefs Had Little Real Authority

Among all Athapascan groups, political organization was loose. One early explorer said of them: "The authority of the chief is limited for the Indians are very unruly and not at all disposed to submit to authority.

"The chiefs are chosen either for their wisdom or courage, and not at all on account of birth. They have no insignia of office, and as for privileges they have all that they can take, and none that the others can withhold from them.

"The chiefs and old men are all who are entitled to speak in council, but any young man will [illegible] up and give his opinion [illegible] the council of wisdom.

The most influential individuals among them were the shamans, or medicine men. They allegedly cured the sick by singing incantations over them and drawing out the evil that afflicted them.

Any person harboring a grudge could hire a shaman to send sickness into an enemy. The shaman was also a prophet who foretold success or failure in hunting or warfare. He could stir up wind or drive away a storm.

[illegible] was entirely in the hands of the offended persons. For adultery only the woman was punished. She could [illegible] or cast off [illegible] for murder, the relatives of the victim [illegible] it. If a shaman had been paid to kill him, the shaman was regarded as innocent. Revenge was taken against the individual who paid him.

The Kutchin once practiced slavery. The [illegible] or any individual in the tribe who happened to be without friends or relatives.

Early observers regarded the Kutchin as the most warlike of the Athapaskan tribes. Most of their fights were with the Eskimo, but sometimes they fought also with their Indian neighbors.

What Well-dressed Baby Sisters Wear Around Fort Hamlin

These teen-age girls [illegible] their little brothers and sisters of the neighbor children. [illegible] dressed on a block of ice. As much from vanity as from modesty, the [illegible]

The Kutchin seem to have been the aggressors in most instances. Usually the [illegible] live was purely [illegible] the desire to capture the possessions of their opponents.

Among the material possessions desired were women. Indian women usually sub[illegible] women often hoded their time patiently [illegible] apparent submission, awaiting an opportunity to take revenge.

Considerable prestige [illegible] gained by individuals as a result [illegible] war exploits, and the [illegible] traditional [illegible] for [illegible]

When a war party was organized [illegible]

feast was held to stir up the proper military spirit. On the way to their objective the warriors killed every creature they encountered.

Warfare Treacherous and Ruthless

Upon meeting their prospective victims, they would act as friends until their hosts were off their guard. They would then grasp their knives and kill men, women, and children, except such women as they wished to capture for wives. A man who had thus killed an enemy in "warfare" advertised the fact by tattooing on his arm a line for each victim.

In times of plenty the Kutchin were enthusiastic over sports and amusements. They liked singing, dancing, and story telling (page 483). For the dances music was furnished by drums and whistles.

Long stories were told by old men and women whenever they could get an audience. Usually these stories were about war or mythological heroes, but sometimes adventures met with on an interesting trip or hunt were recounted.

Gambling and dice games were played with sticks. Sports involving tests of strength, such as tug of war and wrestling, were very popular. Sometimes in the tug-of-war contests men were pitted against women.

Wrestling is still the most favored sport. At the beginning of a tribal wrestling match the two smallest boys are pitted against each other. The winner then takes on the next larger boy, who rushes in before his opponent can get his breath. Thus the contest continues without pause until the wrestlers are the strongest men.

One of the better wrestlers may throw three or four opponents until, perhaps from exhaustion, he in turn is thrown and leaves the field to his conqueror. Finally the champion of the group is reached.

Since he is almost always fresh and his adversary tired, it takes an exceptionally able man to wrest his title from him.

When the male champion has been determined, the women have their turn, the contest beginning with two little girls.

An Exciting but Risky Game

In winter the Kutchin play an unusual and rather dangerous game.

Four trees, growing more or less in the form of a square and about 30 feet apart, are selected, and two rawhide thongs made from moose skin are stretched diagonally between the trees so that they cross in the form of an X, about 20 feet above the ground.

At the point of intersection a small leather platform about a foot square is attached. The participants stand on this to [illegible] in turn and jump up and down.

Each time the player lands on the square the elasticity of the cords throws him higher, until he is thrown more than 10 feet above the platform. The higher he bounces the more difficult it is to keep his balance.

The object is to see who can complete the greatest number of jumps before falling to the ground far below. Of course each participant finally comes a cropper, to the hearty amusement of the spectators.

A similar game is the bouncing of a person, generally a woman, on a moose skin held by many people. This is reminiscent of the popular blanket-tossing game of the Eskimo.

In many ways the customs of the Kutchin resemble those of the Tutchone, Tahltan, and Carrier tribes to the south. All have much that is characteristic of the more spectacular tribes of the northwest coast: competitive potlatch feasts, slavery, and the idea of prestige through the acquisition of wealth.

On the other hand, the Kutchin share with the Eskimo many traits, such as tailored skin costumes, the use of built-up sleds, and wrestling as a favorite sport.

Other customs, particularly those connected with the hunting, snaring, and trapping of animals, they share with their Athapascan neighbors and the Algonquian tribes to the south and east. In short, there is little in the lives of the Athapascan tribes, other than their language, that is characteristic of them alone.

The Cree, who were probably an offshoot of the closely related Chippewa, are the largest and in many respects the most typical of the northern Algonquian tribes.

They occupied the territory south of Hudson Bay, almost to the Great Lakes, extending eastward to the base of the Labrador Peninsula and westward to the northern Great Plains. There one branch, the Plains Cree, took on a typical Plains culture like their neighbors, the Blackfeet and the Assiniboin. They were true nomads, moving their camps seasonally with the movements of game and fish.

The Woodland Cree were expert at handling their light, portable, birch-bark canoes, and most of their extensive travels were performed on the lakes and rivers of their territory.

Their dress consisted of tight leather leggings reaching to the hip. A leather strip was passed between the legs and under a belt around the waist, the ends hanging down in front and behind.

A Cree Mother at James Bay, Quebec, Carries Her Twin Babes in Moss Bags

[illegible] their southern [illegible] on page 47[illegible]

In cold weather a fur cape was worn, [illegible] times decorated with the tail of a furbearing animal. When needed, [illegible] over the shoulders. Moccasins were [illegible] and in cold weather [illegible] were [illegible]

[illegible] and became [illegible] Lynx. [illegible] the [illegible] were added to the over all garment.

Otherwise Honest Cree Cheaters in Trade

[illegible] traders [illegible] the Cree from [illegible] were experts in fraud and cunning with respect to trade, but that in all other matters they were scrupulously honest and trustworthy. They were also described as being quiet in disposition, extremely generous and of moral behavior and hospitality was [illegible]

Physically they were a handsome [illegible]

The [illegible] explorer and explorer Alexander Mackenzie said of them: "Their eyes [illegible] keen and penetrating; their countenance open and agreeable . . .

Of all the nations which I have seen on this continent, the Cree women are the most comely. Their figures [illegible] proportioned, and the [illegible] would be picked [illegible] more civilized people of Europe. [illegible] complexion has [illegible] of that dark [illegible] which is common to those [illegible] who have [illegible]

Another account [illegible] the Cree in [illegible] more [illegible] a contrast [illegible] much greater curiosity than a [illegible]

Men [illegible] wife and [illegible] considered his duty to marry [illegible]

Before the introduction of [illegible] trade [illegible] the Cree [illegible] and [illegible] were

made of stone, while knives, fishhooks, and awls were of bone.

Vegetable fibers were woven into twine for sewing the bark covers on their canoes and for making fish nets. The common type of dwelling was the conical tepee covered either with skins or birch bark (page 482).

In former times Cree men decorated themselves with tattooing, sometimes covering the entire body. The women usually contented themselves with two or three simple lines on the face.

Their mode of living began to change rapidly with the coming of the fur traders in the latter part of the 17th century. They diverted much of their energy to the trapping of fur-bearing animals which they brought to the trading posts in exchange for commodities of white manufacture.

A primary factor in their breakdown was the large-scale introduction of alcoholic spirits by the traders. Smallpox, brought in by the whites in 1786, reduced their numbers from 15,000 to about 3,000.

Warlike Naskapi Tough as Their Land

The northernmost of the Algonquian group are the Naskapi and the closely related Montagnais, who occupy the entire peninsula of Labrador excepting for its northern and western coast. The customs of the Naskapi, basically Eastern Woodlands, have been considerably modified by severe climate and by their proximity to the Eskimo tribes occupying the Labrador coast (page 480).

Formerly the Naskapi were in a continual state of warfare with their Eskimo neighbors, but for the past century they have associated amicably.

The Naskapi are highly nomadic. In the winter they travel in the interior in search of game, principally caribou, hares, rabbits, moose, and ptarmigan. Eggs of wildfowl are extensively eaten in all stages of incubation.

These people are experts in the use of traps and snares, like members of the other northern tribes.

In early days they made traps in great variety, according to the type of game being sought. In general, throughout the northern regions deadfalls were used for flesh-eating animals and snares for the herbivorous types.

Caribou are caught in snares, shot from ambush, or speared from canoes while they are swimming (page 490). Their flesh is preserved by drying, after which it is pounded and made into pemmican.

The Naskapi, like the other nomadic groups, are only loosely organized, but they have shamans who act as medicine men and prophets and are supposed to foretell the movements of game and weather.

Their clothing varies with the season, since weather becomes almost as warm in the brief summer as it is cold in the winter. A man wears a long dressed coat of caribou skin made in the shape of a frock coat, leather breeches, leggings, moccasins, gloves, and a fur cap. The leather coats are decorated with brilliant painted designs in red, blue, yellow, and brown.

In the summer the Naskapi travel in birch-bark canoes and in the winter they use the toboggan, drawn both by men and by women. They wear unusually broad snowshoes, almost round in shape (page 474). In addition to the usual type with frame and netting, they sometimes use an oval form made of flat boards.

Their Eskimo neighbors wear very crude snowshoes that appear to be inadequate imitations of those made by the Naskapi.

The early-day Naskapi lived in skin-covered conical tepees, both in winter and in summer. In winter they sometimes made a crude sort of snowhouse by constructing a frame of spruce boughs, which was covered with snow.

They lived in alternate abundance and want. Sometimes after a long period of hunger followed by a successful caribou hunt they would gorge themselves with incredible quantities of meat.

With the coming of spring and summer, swarms of biting flies and mosquitoes appear. No white travelers passing through the interior of Labrador have failed to reserve their best eloquence for describing the insect pests.

The Micmac were an important Algonquian tribe that occupied Nova Scotia, including Cape Breton Island, the northern part of New Brunswick, and Prince Edward Island (pages 493, 499, and 503).

They were a fierce and warlike group, and their country supported a fairly dense population. Early they became enemies of the English and friends of the French, a condition which existed for more than two centuries. They lived by hunting and fishing, and their dwellings were tepees covered with skins, birch bark, or matting.

For clothing they wore leather garments made more in the style of New England Indians than that used by their northern neighbors. Like the Naskapi, however, they painted their costumes in bright-colored patterns.

They had a more advanced type of political organization than the northern tribes, their chiefs apparently having some real authority.

A Kutchin Mother Cradled Her Baby in Birch Bark. Were Trimmed Their Feathers

To tattoo chin and cheeks, Alaska Indians pulled a sooty-tipped

It Winter Comes the Naskapi Hunter Disposes with Preparations for the Trail

Eskimos in Frozen Kayaks Run Down Walrus Bull. Photo by E. Harpending and Engraving by Courtesy Physical Culture Series

Scene West of Cave Spring Ranch in 1880-81, When the Red Man Wrested a Livelihood from Virgin Forests

[illegible]

Katsura of the Yellow Rose (1900) Performing Lilac Dances In Set Up Lightness Space Mouton Leader or Cohesive Gold Days

Only Central Eskimos Build Winter Igloo Villages; Mission Eskimos Construct No Snowhouses Save in Temporary Shelters

In the [illegible] Central Eskimos [illegible] Mission Eskimos [illegible] Winter [illegible] Usual [illegible]

Though the Outdoor Temperature Is Seasonable, a Hearty Fire Should Be Turned Inside, Possibly All Day Long

[illegible]

Elsie Dove, [illegible] in Lendmeal Scale, This Grandmother Wears a Cape of Beads

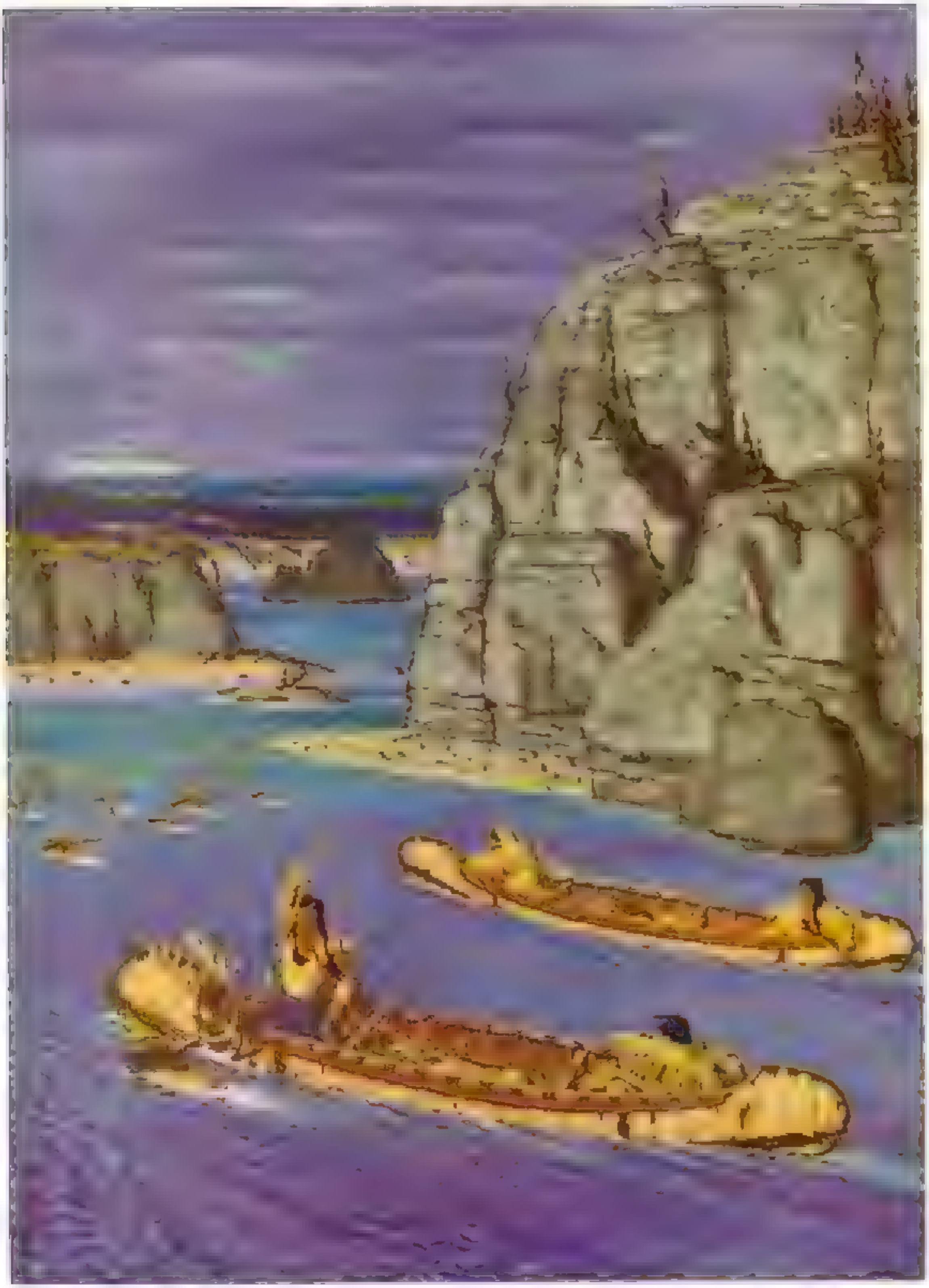
[illegible]

While Dogs Worry the Polar Bear, an Eskimo Stabs Him with a Knife Fastened to a Stick

Here are Eskimo men, valuable draft animals. Dogs are used to run down large game, bring it to bay, and hold it until the hunter arrives. The man in the foreground is using a stick to make a sheath for a knife.

A Real Treat Is in Prospect as Eskimo Women Cut Up a Beluga, or White Whale, the Small Species Specially Prized as Food

By the Lurid Light of the Aurora Borealis, Captain [illegible] Moves Toward the Coast To Pass the Winter Home



Yellowstone Lake, Spectacular Wonder Among Its Landscape by Innumerable Streams Flow into the lakes and streams. Here and there bubbles rise, take [illegible]

King Island, Falmouth Cove, Home to Four Outside Stations on Waterfront Circuit

Old-time Chippewyans Going Across Vast Fields of Snow, To Trade at Fort Prince of Wales, Churchill, Manitoba

[illegible]

In Summer Camp Beside a Bras d'Or Lake, about 1879 Micmac Indespeople Make Everything Shipshape for Winter

[illegible]

Alaskan Eskimo Characters In a Takeoff of a Kutchin Dance

During historic times they took up the practice of agriculture to a limited extent.

The Unique Eskimo

The unique and in many respects the most remarkable group of aborigines in the New World was the Eskimo. Spreading across some 6,000 miles of Arctic coast from East Cape, Siberia, to eastern Greenland, these people exhibit a surprising unity in physical type, language, and customs. In no other part of the world did an aboriginal group extend itself so widely over land.

Although the Eskimo are unmistakably of Asiatic origin, many ethnologists prefer not to refer to them as "Indians" but as a group apart. The matter of nomenclature is unimportant, since the term "Indian" in any case is arbitrarily applied.

It would be easy to explain their individuality by saying that the Eskimo were late arrivals from Asia who, already adapted to an Arctic environment, spread rapidly along the uninhabited Arctic coast, by-passing the established tribes.

Archeology proves, however, that this was not the case. In the western part of their domain remains have been found which date back 2,000 years or more. These remains—and we are not certain that still earlier may not be found—show that these ancient people were true Eskimo who already had a well-developed culture.

Dire Necessity Mother of Invention

Many obstacles to human existence that Nature imposed in the extreme north had to be overcome before the Eskimo could wrest a wintertime living from this environment.

First, because he had to be able to travel effectively, he invented the toboggan and the sled to carry his loads over the deep snow.

Later he learned to make the sled more effective by breeding large dogs to draw it.

For travel on slippery ice he used ice creepers. To prevent snow blindness, visors were used, and goggles were carved from ivory and wood with narrow slits to cut down the pitiless reflected light of the sun on the limitless snowfields (page 484).

To shelter himself in a region of extremely low temperatures and freezing blizzards, in areas completely devoid of wood or stone, he invented the snowhouse (pages 472, 484, 501).

Life in a snowhouse would be impossible without heat. Lacking other fuel, he learned to burn, in lamps of pottery or stone, oil derived from the fat of sea mammals. This same flame furnished him with light and with heat for cooking (page 485).

To hunt on the sea ice in the longer winter cold, he had to protect his body from the [illegible] temperatures. Therefore he made fully tailored fur-lined garments of skins, complete with mittens and hoods.

To take the wily sea mammals on which his existence depended, he devised specialized weapons such as the harpoon and the compound recurved and sinew-backed bow. The latter was a necessity because of the absence of suitable wood.

He invented scores of devices to improve his basic tools—swivels and buckles for his dog harness and bone and ivory shoes for his sleds, the runners of which he learned to ice to reduce friction.

To all of his needs he adapted the products of Nature—shoulder blades of walrus for snow shovels, walrus tusks for ice picks. Sinew and baleen were used in place of fibre for cordage. From flat pieces of slate he made knives and harpoon points.

Many of these devices were adopted in modified form by the Indian tribes adjoining Eskimo territory, and some of them spread to the benefit of tribes thousands of miles away. Among items probably originally derived from the Eskimo are the tailored skin clothing and the dog travois used as far away as the southern Plains.

The strongest influence from the Eskimo, however, is to be found among the northern Athapaskan [illegible] Kutchin and the Naskapi, whose culture is strongly colored by the Eskimo. The bark-covered canoe may have been derived from the Eskimo kayak.

All evidence points to the origin of the Eskimo and most of their culture in north-central Asia, but archeological work has not progressed as yet to the same degree in Siberia as it has in America.

Bering Sea People Came 2,000 Years Ago

Unlike the relatively uniform Eskimo culture of Arctic America, we find along the Arctic coast of Siberia several different languages and culture groups. These were produced evidently by separate northern movements of peoples from the interior of Asia following the long river systems which flow from central Asia into the Arctic.

Traits resembling those of the ancient Eskimo can be found as far west as the Ob River and as far south as Lake Baikal.

One of these movements more than 2,000 years ago reached the shores of Bering Sea in easternmost Siberia. Here these people found a great abundance of walrus and seals, which supplied a large part of the necessities

From Lar Perry, Kaer Sho Brought a Sick Child to Nulato

[illegible] of [illegible] Bay [illegible] Mission [illegible] Eskimo [illegible] cloth coat [illegible]

[illegible] people coming from the North Pacific coast of Asia may have preceded them into Arctic America.

They lived in communal [illegible] small rectangular [illegible] on the ground. These structures had floors of stone and walls of driftwood and whale bones laid horizontally between posts. The roofs were made of driftwood [illegible] with turf, [illegible] was by a hole [illegible] which provided an entrance [illegible] the weather.

They did not construct [illegible] vessels and made [illegible] shallow pottery [illegible] which [illegible] oil lamps. Most tools such as [illegible] were carved of driftwood.

Water transportation was by boats covered with sealskin. These were of two types, the kayak and the umiak [illegible] for [illegible] use.

The kayak is a small rigid one-man canoe completely decked over with skin excepting for a round manhole in which the occupant sits. When the waterproof garment of the Eskimo is fitted over the manhole, the kayak is unsinkable. It is maneuvered by a light double-bladed wooden paddle, and is essentially [illegible] handling it that when it capsizes they can right themselves immediately by means of the paddle [illegible]

of life as well as plenty of fish and birds.

In these skin-covered boats the crossing of Bering Strait presented no difficulties, and they were soon settled in permanent villages on the intermediate Diomede Islands and on Seward Peninsula to the south. Others established their settlements on the Arctic coast [illegible] Some of the [illegible] provided them with all essentials, they felt no immediate need of leaving their coast and island towns to penetrate the American interior.

These [illegible] Old Bone People. They are the first Eskimo of whom we have definite knowledge, although [illegible]

* See [illegible] "Discovering Alaska's Oldest Arctic Town," by [illegible] French Fraternity of American Hospitals, [illegible]

The umiak is known as the woman's boat. It is a large open craft something like a whaleboat. Like the kayak, it consists of a [illegible] covered with [illegible] The only instance of the use of oars in the New World. It will carry a considerable number of people or a sizable cargo (pages 490, 491).

The Harpoon Indispensable to Eskimo Life

The weapon with which these people hunted and one of the most important possessions of these and the later Eskimo was the harpoon. This was a complex spear, with a detachable head of ivory or bone attached to a line and float, indispensable for hunting sea mammals.

Among most tribes having the ceramic art changes in pottery types and decorations constitute the medium in which the archeologist most depends for indicating different [illegible] In the case of the Eskimo, a much more abundant [illegible] sensitive period marker was the harpoon head.

The Eskimo Shaman Ruled Through Fear

[illegible] three days in a frozen lake. His supernatural powers declared [illegible] he could make walrus tusks grow out of his jaws and that he could [illegible] Despite his alleged [illegible] sunglasses to do his snow blindness [illegible] these he wore slit masks carved from ivory or wood (page 454). [illegible] creates the illusion of a grayish [illegible]

Both its form and manner of decoration changed with the different periods, so that the age of a prehistoric Eskimo site can be determined by the harpoon heads found in it.

For travel on land these early Eskimos used small sledges with low, heavy runners, as well as toboggans made from strips of baleen. Both were drawn by human power, the only dogs being a small speed breed apparently [illegible] for food.

Stone tools were knives [illegible] wedges for splitting driftwood. Harpoon heads and other objects of carved ivory were decorated with pleasing curvilinear designs [illegible] Fire was [illegible] with the bow drill. The drill shaft was supported in the socket of an ivory or wooden "mask" fitted over the mouth of the operator, and the shaft made to revolve rapidly by means of a turn taken around it with a bow string. The bow was manipulated back and forth with the free hand.

Clothing tailored from seal skins or bird skins, and waterproof garments made from seal intestines were similar to those used by present-day Eskimo.

For several centuries the Old Bering Sea people prospered. Some changes took place

Canadian Eskimos Form a Human Chain To Corral a Herd of Reindeer in a Northwest Territories Roundup

Brought from Siberia, Reindeer in Alaska Once Were Peaceful, but Now Sometimes Gray [illegible]

On the Spruce-clad Shores of Bass (Or Lake) Minnie Youngsters Clamber Aboard Their Bus When School Is On

A Bass (Or Lake) Minnie school bus pulls up to pick up pupils. Local residents have paid for the construction of a school building, and the school district provides a teacher. Now the youngsters in Bass (Or Lake) Minnie can get an education without having to board in Fort Frances, which is 100 miles away. Bass (Or Lake) Minnie is a Metis community of about 150 people. Most of the people live by fishing and trapping. Their language is a mixture of Indian and French. Most Metis are Roman Catholics.

Neither Eskimo Girl Nor Little Polar Bear Looks Happy

On a fox hunt, three men of the Mackenzie River Delta found this cub and its mother and brother in a [illegible] Because of its size and strength, is the only [illegible] of the Arctic (page 487).

in their manner of making and decorating their tools and utensils, but they were minor ones.

In the Alaskan mainland the tribe extended itself a little to the north, where a group developed called the Birnik people by archeologists. Others moved to the south but remained a coastal and a maritime people.

About a thousand years ago a period of strong change and expansion took place. New traits and ideas from Siberia broke through the old conservatism.

At this time iron in small quantities was acquired from Asia. The use of iron engraving and carving tools produced a conspicuous change in art styles. Decorative designs became bolder and more rigid. The art of making stone tools was abandoned, and ground-stone implements generally made of slate took their place.

The whaling harpoon was introduced along the Pacific coast of Asia. Many new and ingenious minor hunting aids were adopted, such as bird arrows, bird bolas, and fish hooks.

The Bird Bolas an Ingenious Weapon

The bird bolas was an ingenious device consisting of a number of ivory balls attached to strings. The hunter hurled it at birds, and when any part of the bolas struck a bird, the remainder whirled about, entangling the victim in the strings.

Improvements were made in the complex sinew-backed bow. With its increased power the archers began to wear wrist guards to protect them from the rebound of the bow string (page 487).

For warfare body armor made from bone plates came into use. With the increased food take resulting from these inventions population increased. Houses became larger, and with population pressure a strong eastward movement began along the Arctic coast, a movement which did not stop until the entire coast was populated as far as eastern Greenland in the north and Newfoundland in the south.

These Eskimo are known to archeologists as

the Punuk in their Bering Sea habitat and as the Thule in the eastern Arctic. The rapidity and vast extent of this population spread are explained in part by the fact that until Hudson Bay was reached they encountered no human inhabitants along their line of migration.

From Hudson Bay to Greenland, however, they came into contact with another people who had settled this region long before. This rather primitive group, known as the Dorset to archeologists, possessed a culture related in some ways to the Eskimo. In other ways it was more like that of the Indians.

At this time the Dorset remain an archeological mystery, but their closest antecedents are found along the Pacific coast of Asia. Although no traces of them have been found in the West as yet, archeologists are inclined to believe that they were a very early Eskimo group that crossed into America before the Old Bering Sea people, traveling eastward and finally settling the area east of Hudson Bay from Labrador to Greenland. Upon the arrival of the Thule they disappeared, in part being displaced and in part merging with them.

Once the Arctic coast became populated in this manner, approximately a. d. 1000, minor local differences began to appear among the many Eskimo groups that settled along the far-flung coast until in modern times we classify them roughly as the Western, Central, and Eastern Eskimo.

First Meeting of Europeans and Eskimo

Excavations in Greenland have demonstrated that the Inugsuk Eskimo, who were descended from the Thule, came into contact with the Norse in the 13th century. This earliest material evidence known of the meeting of Europeans with American aborigines, gives archeologists a definite point of departure in dating the early phases of Eskimo culture.

Islands of the central Arctic coast were formerly occupied extensively by the Thule people. Most of these sites were abandoned long ago. Within the last thousand years the land has risen from the sea in this area to a height of more than 30 feet, closing passages and making the sea so shoal in many places that whales no longer visit the section.

The Thule, who depended largely on whales for their subsistence, were compelled to leave the region.

One important change in the manner of life of the Eskimo has been adoption of seasonal migration. In the winter they lived on the sea ice, hunting sea mammals, and in the summer they moved inland in search of the caribou and other land animals and fished in the lakes and rivers. Most typical are the Central Eskimo.

During summer they lived in skin-covered portable tents, each family often going its separate way. When they returned in the winter to the sea ice, they congregated in communities of snowhouses.

The men wandered far across the ice in search of breathing holes of seals, where they would wait patiently for the seal to appear so that they could spear it. Another method was to set nets made of baleen under the ice where the seals would become entangled in them. On warm days the seals sometimes emerged through their breathing holes to bask on the ice, where the hunter would stalk them with his harpoon.

This type of hunting required skill, patience, and an intimate knowledge of the behavior and habits of the game. This knowledge was acquired early in life by small boys, who accompanied their fathers on hunts and shared their hardships in the severe climate.

Snowhouses, not used so far as known by the early Eskimo, nor by the Alaska Eskimo, were [illegible] in shape, built of compact [illegible] and locked with a key block at the apex of the dome. Platforms of snow were built inside next to the wall. These were covered with furs and used for lounging and sleeping (pages 472, 484, and 455).

When the interior of the newly built house was heated, a glaze of ice formed over the interior, making it strong and compact. Light was admitted by "windows" made of ice.

The ingenuity of the Eskimo is illustrated in the use of the stone or pottery lamp. In a woodless region, life on the sea ice would be impossible without it. It consists of a shallow bowl of stone or pottery. The fuel is seal or whale oil and the wick is of twisted moss or some other absorbent.

How the Eskimo Lighted Fires

In aboriginal times the Eskimo made fire by striking together two pieces of iron pyrites, driving a spark into a piece of tinder, or through friction produced by means of the bow drill. The lamp which furnished light during the long winter night also produced enough warmth to heat adequately the almost airtight winter houses, and over it the Eskimo of the coast cooked their food.

The costumes of the Eskimo, differing somewhat regionally, were also remarkably adapted to the severe climate. The coat, closed in front as well as [illegible], had a critical hood that hung down the back or could be worn over the head.

To the Eskimo a Whale Is a Veritable Gold Mine

These folk of Point Hope [illegible] The flesh is used for food [illegible] and food containers are made [illegible] the place of vegetable fibers [illegible]

In the Eastern and Central groups it was cut away at the sides and had a long tail down the back, looking for all the world like a modern Tuxedo man's full-dress coat. This tail served a useful purpose when the hunter was obliged to sit for long periods on a block of ice or snow.

Trousers were knee length, and long skin high boots and mittens completed the costume.

The clothing was similar for both sexes, except that the coat of the woman was more ample so that a baby could be carried on the back underneath it. The Eskimo did not use the cradleboard or moss bag of the Indians. The material for clothing was generally of reindeer skin, but seal skin was often substituted.

In Alaska, garments were also made of bird skins or those of small mammals sewed together. Light rainproof costumes were made from the intestines of sea mammals.

The [illegible] Eskimo apparently derived [illegible] up [illegible] author [illegible] to [illegible] cultivate his long seasonal migrations.

Like their Indian neighbors to the south, the Eskimo have little if any political organization. Lacking chiefs, the family is the principal group unit. The most influential individuals among them are the shamans, who influence the actions of the group leaders.

The Eskimo believe in a large group of Nature spirits and also in a number of more powerful beings who exert powers of good [illegible] By means of various talismans they conjure up these spirits at need and communicate with them.

The shaman of course is the one mostly concerned with [illegible] (page [illegible]). An [illegible] he and stories [illegible] with these and other supernatural beings and the adventures of culture heroes.

Shaman Doctors' Treatment Rough

As among other tribes, the shaman is also the doctor. When the Labrador Eskimo medicine man is called, he is blindfolded. The patient lies on his back on the ground, and the shaman, when worked up to a proper state of frenzy, throws himself on his victim and begins to chase the evil from its hiding place. Meanwhile, the patient is on the receiving end of a series of violent blows and kicks.

As the spell develops, the shaman gives vent to [illegible] sounds, shouting [illegible] an evil spirit supposedly [illegible] the body. After a time the shaman announces that he

Mission Children Learn Three R's Instead of Hunting, Trapping, or Building Wigwams

[illegible] The wall decoration was done in [illegible]

[illegible] in missing the spirit and getting [illegible]

[illegible] into the body [illegible] the shaman [illegible]. In the other case the [illegible] is [illegible]. In the latter [illegible] interference [illegible] fee for his efforts.

When a [illegible] Eskimo is seriously ill, [illegible] relatives [illegible] outside before death if possible. [illegible] a hole must [illegible] the house, through which [illegible] removed. [illegible] the ghost of the departed [illegible] returning [illegible] would had the body [illegible] through the door.

[illegible] dressed and bound [illegible]. The burial bundle is placed [illegible] or on a hilltop and covered with [illegible] to protect it. [illegible] the earth is [illegible] the frozen ground. [illegible]

Among other functions, the [illegible] interprets dreams, [illegible] weather and [illegible] of game animals.

Despite his [illegible] mirable of all primitive peoples.

Indians Indispensable to Fur Traders

[illegible] 18th century [illegible] in the long cold winters [illegible]

The Indians, whose [illegible] and skill at hunting made them ideal trappers, were [illegible] aid to the traders, who [illegible] them with guns and steel traps [illegible]

The Indian quickly [illegible]

A Akhnikova Poet Sat in Frozen Ground Takes the Place of the "Old Apple Tree"

[illegible]

Busy Fairbanks Sets Alaska's Pace

By Peter A. Wilson

AT FIRST [illegible] Fairbanks, Alaska, looks much like Main Street anywhere.

Weathered frame shops are wedged between glistening concrete buildings. Automobiles and trucks are angle-parked along the curbstones. Shirt-sleeved townspeople and farmers in dusty overalls mingle on the sidewalk.

"This could be Ohio or Kansas," I told myself.

Then I began to see the differences.

Eight airline offices stood within half a block—in a city of 8,500. They are busy almost 24 hours a day.

Groups of Eskimos and Indians passed, high-cheeked bronze faces grinning above business suits and calico dresses. A boy skipped beside a panting, heavy-furred Malemute sled dog.

A block away the concrete paving ended. Along the gravel road log cabins and frame houses stood side by side.

Even the phrases dropped by tired old men lounging in the hotel lobby were different: "The diggin's at Fortymile . . . sluiced for two months . . . struck color below Dawson."

This is Alaska, I reminded myself. My hotel room is only 120 miles south of the Arctic Circle.

The Air Age Brings a New Boom

"Forty years ago we were a gold-rush boom town," former Mayor Hjalmar Nordale told me. "Today we're an air-base boom town. I don't think we'll ever be a normal city."

Most of Uncle Sam's World War II air [illegible] Ladd Air Force Base (page 512) at Fairbanks, jumping-off place for Soviet pilots who ferried thousands of Lend-Lease aircraft to Siberia, today is busier than ever.

Civilian construction crews and GI's rush an expansion program for which $60,500,000 of the $176,000,000 outlay authorized for developing an Arctic defense system in Alaska has been earmarked.

Twenty miles southeast of Fairbanks the Government is spending $35,300,000 to [illegible] Eielson Air Force Base, capable of handling huge long-range bombers still on the drawing boards.

Three times a week a reconnaissance squadron at Eielson sends heavily gadgeted B-29's over the North Pole for weather information.

This "golden heart of Alaska" has become one of the strategic cities of the world. Bomber squadrons leaping across the Arctic pack from Fairbanks might well be the "minute men" of another war.*

At Heart of Big Trade Area

Like the hub of a wheel, Fairbanks lies near the center of a vast trade area encompassing hundreds of square miles of Alaska's rugged interior. Supplies come from southern coastal ports over the Alaska Railroad (page 520) or the graveled Richardson Highway (page 506). Fairbanks distributes them by truck, river boat, and airplane.

Core of this sprawling network is Second Avenue, Fairbanks's main street (page 508). One man, more than any other, has given Second Avenue its 20th-century appearance.

Austin E. (Cap) Lathrop (page 515) skippered the freight schooner of which he was part owner to Alaska in 1898.

He hauled freight and men bound for the gold fields; later opened a drayage business; turned his hand to many and varied projects. His industry and business acumen have brought him a sizable fortune in the 53 years since he first arrived in Alaska.

Cap has never made a cent out of gold mining, fishing, or trapping, Alaska's three leading industries. And he has poured his profits back into the Territory instead of taking them Outside to spend.

He put $250,000 into two theaters and $500,000 into a four story apartment building which houses his radio station, KFAR, and his daily newspaper, the *News-Miner* (page 509). These three white concrete structures and the vanilla-hued Federal Building dominate the downtown scene.

Besides his Fairbanks properties, Cap has an interest in Alaska's largest coal mine, and owns banks, theaters, and apartment houses in several other northland cities.

But Cap, past 80, doesn't even have a desk for himself. He spends all his time on the move, inspecting his properties and pitching in where an extra hand is needed.

Luxury on the Arctic Fringe

Even Cap's business rivals admit his luxurious theaters, with indirect lighting and cushioned seats, and his steam-heated apartment brought Fairbanks its first—and welcome—touch of elegance.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Out An Frontier in Alaska," by Gen. H. H. Arnold, October 1945, and "Strategic Alaska Looks Ahead," by Ernest H. Gruening, September, 1942.

Richardson Highway, Alaska's Longest, Links Fairbanks with the Sea at Valdez

[illegible] Washington Glacier (upper left) [illegible] Thompson Pass, at the [illegible] Mountains (lower [illegible] moved tons of surplus [illegible] The first auto [illegible] over the Richardson in [illegible], required [illegible] Tod [illegible] vehicles [illegible] built [illegible] The highway is passable from June to October [illegible] every [illegible] 20 miles [illegible] Service

Today most residents live as easily here on the fringe of the Arctic as the average [illegible] and many luxuries.

Next to my hotel was a women's dress shop. In the window was a silk-taffeta evening gown studded with rhinestones. The price was $159.50.

"Can I sell a dress like that?" repeated the proprietress. "Many of them! The women of Fairbanks are as comfortably [illegible] as any. [illegible] the New York [illegible] are [illegible] my selections. They still think we live on an igloo."

An Arctic [illegible] clinching [illegible] added her testimony. "During the past six months in Alaska," she said, "I've worn my evening dresses more often than I did during five years in the States."

I wandered past well-stocked grocery stores. [illegible] were high. Farmers in the surrounding Tanana Valley supply some produce. The rest is [illegible] flying fresh foodstuffs from Seattle.

Bananas were 25 cents each. A loaf of bread was 25 cents. Fresh strawberries started at [illegible]

The overall cost of living in Fairbanks is roughly 50 to 60 percent higher than in Seattle.

Silver Dollar's Clink Still Heard

[illegible] is still silver-dollar country.

[illegible] to his theaters was worth exactly [illegible] He had to import sacks of nickels and [illegible] to make change.

Fairbanks didn't bother much with pennies until a chain grocery moved in with goods [illegible]

introduced paper dollars just before the war. But the heavy clank of silver dollars still drowns out the crinkle of "folding money."

I strolled away from the downtown area. Abruptly the streets became gravel. Some blocks were lined with boardwalks or jagged footpaths. Sturdy log cabins, some 30 or 40 years old, crouched beneath the trees.

One-third of Fairbanks's homes are cabins. Graehl, an unofficial "mayor" of retired prospectors, consists almost entirely of aging log cabins. The builders had no metal materials. Wooden pegs fasten the logs. Roofs, insulated with layers of dirt, in season are gay with wild flowers.

In the cabins, modest frame dwellings, and beautiful colonial mansions of Fairbanks people live much as we do in statesize cities of 25,000. Most of them enjoy every modern utility except piped-in drinking water. Homes that lack their own wells buy from water wagons at 25 cents for five gallons.

Most of Fairbanks's letters reach farthest points in the States within three days by air mail. Packages sent by ship and rail take four to six weeks and longer. Lacking variety in entertainment, Fairbanks reads avidly. In every home I visited, I saw many magazines and books.

Summer Is the Busy Season

During the summer, however, Fairbanks has little time to relax. In about 95 days between killing frosts must be crammed all the prospecting, mining, farming, and much of the other commercial activity.

During the nine-month winter parties are held, and stay-at-homes turn to their bookshelves.

Forty-seven years ago the present site of Fairbanks was a stretch of unpeopled woodlands. In September, 1902, an Italian prospector, Felix Pedro, struck gold on a near-by creek. A few days later, 13 miners and traders met on "Pedro Creek" to organize the mining district. I talked with Otto Nilson, the only living survivor of that meeting.

"Our chairman was 'Whitehorse' Smith," Otto said. "We named the place after one of his friends, Senator, later Vice President, Charles W. Fairbanks of Indiana.

"After the meeting I went out to stake my claim. I passed up creeks worth $130,000 a season. I staked on Little Eldorado and worked the creek 34 years, but I never found the pay streak.

"Today I've got enough to get along on but that's all." Otto is past 80. His home is small and his furnishings modest.

Hundreds of prospectors rushed to the Fairbanks diggings. At the Klondike they had stopped in shallow streams to pan their gold. They found most of Fairbanks's gold deep [illegible] A few men made fortunes, but many—like Otto Nilson—have little to show.

Giant Dredges Extract Gold

Today most gold taken in the Fairbanks area is mined by the United States Smelting, Refining and Mining Company. I drove to their Cripple-Ester field, one of several near Fairbanks.

A giant gold dredge, larger than the average two-story house, gnawed at a riverbed. An endless chain of buckets scooped up the gravel. Inside the dredge the gold was extracted. A long wooden "neck" spewed out the worthless gravel and rock.

Hydraulic crews worked a few hundred yards ahead of the dredge. They had turned their "giants," or nozzles, on an exposed embankment, and powerful streams of water bit into the permanently frozen ground, thawing it for dredging operations (page 514).

Dredging outfits cost millions of dollars. Returns must be great to repay the investment.

Most of the gold mining workers come to Fairbanks each spring from homes in the Pacific Northwest. From April to October the dredges work 24 hours a day to take full advantage of the brief summer thaw.

Alaskans are noted for unusual avocations. I met a striking example at the Cripple-Ester camp. Pete Maas, who came from the Netherlands 15 years ago, bakes bread at night and hunts for prehistoric bones during the day.

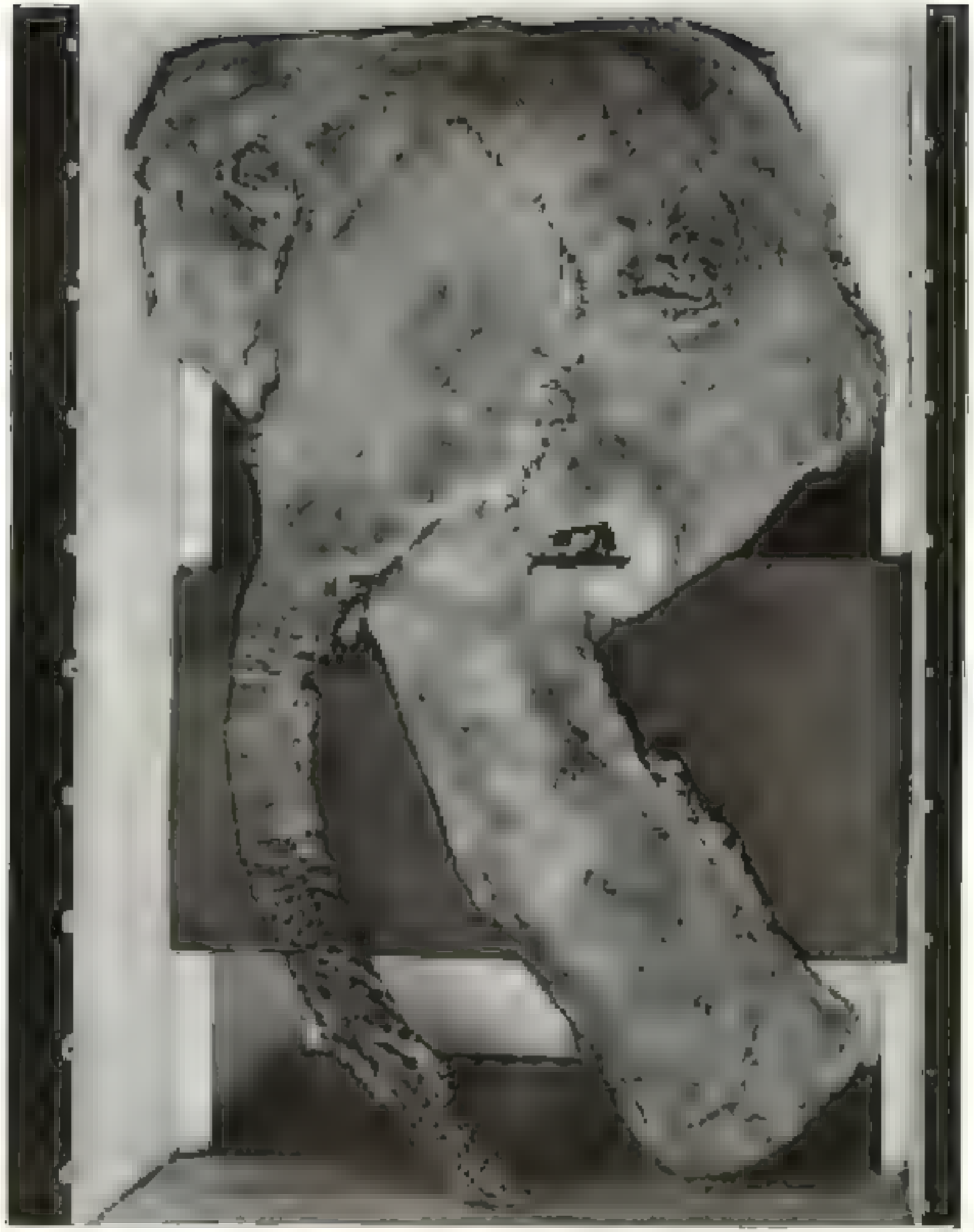
Each morning Mr. Maas and his lean police dog, Bola, set forth on a careful inspection of the ground most recently turned up by the gold dredge. They have made dozens of valuable discoveries, recognized by leading authorities.

A recent find made by "hydraulickers" in this prehistoric deep freeze near Fairbanks was part of a young mammoth, an extinct elephant, with flesh, hide, and hair intact. In the past such animals have been studied locally by University of Alaska paleontologists and others. The animals, however, decomposed quickly once they thawed out.

This specimen was packed in dry ice and flown to New York. There, in a glass-topped home freezer, it was put on exhibition at the American Museum of Natural History in New York City. It was the first time the museum had displayed the flesh of a prehistoric animal.

Glittering New Cleveland Buildings Follow Weathered Frame Shops Along Second Avenue, Fairbanks's Main Street

[illegible]



Alaska's Deep Freeze Yields a Prehistoric Baby Mammoth

[illegible]

They're on the Air To Banish Northland Loneliness

[illegible]

The creature lived at least 15,000 years ago, and may be considerably older, for it is not known how long it remained frozen beneath the tundra (page 509).

While the great bulk of Alaska's gold today is extracted by dredges, a small legion of prospectors still seek their "big strike" with tents, picks, and gold pans (page 514). Back in Fairbanks I found one "laying in" his summer's supplies.

Dave Winters, a young ex-GI from Montana, explained his quest: "We've got roads now. From them we can get into thousands of acres the old-timers couldn't even touch. We can take more equipment, and stay longer."

The big profits today, he said, would come [illegible] in the claim rather than from the gold a prospector actually pans. Dave estimated his outfit and summer's expenses would total $3,000.

Some prospectors have learned to fly and purchased their own airplanes. This movement gained impetus some time ago when a bush pilot flew a prospector into the wilderness in June, but was killed in a crash a few weeks later. He left no record of the prospector's location. The deserted miner reached Fairbanks afoot in late October, a few days ahead of freezing wintry weather.

Alaska Uses Planes as Taxis

In Alaska airplanes are used as trains, buses, trucks, streetcars, and taxicabs. Weeks Field, on the edge of the city, is bordered on one side by a row of busy hangars. Dozens of airplanes take off and land daily.

Within 20 minutes I saw seven planes come in—a flying sportsman back from scouting caribou herds; a bush plane with three Indian passengers; a Navy transport from the Government oil project at Barrow, a missionary completing his first solo; a Pan American clipper from Seattle; another bush plane from Nome; and a third from Anchorage.

In the offices of Wien Alaska Airlines I met Noel Wien, one of the handful of old-time bush pilots who pioneered Alaska aviation in the early twenties. As late as 1941, they flew ancient planes without radios, and generally without weather forecasts.

"Our Fairbanks landing field was a ball park in the early days," Wien recalled. "I had a Fokker with no brakes. I had to touch ground at dusk on the edge of the field, then zigzag to slow down and stop."

Frank Pidgeck, now in business Outside, is another veteran of Alaska air lines. "The ball park had no lights," he said. "Once, in pitch darkness, I took off across the field, instead of down the 'runway,' and carried a pine tree in my wheels to 11,000 feet before I could shake it off."

Both Wien and Pollock have logged more than a million miles flown in Alaska. Noel's brother, Sig, has flown 750,000 miles north of the Arctic Circle, more than any other man, it is claimed. Jim Dodson, another old-timer, on two separate "mercy flights" has helped deliver Indian babies while flying his plane.

Villages Rely on Bush Pilots

Today multi-engined planes, well equipped with safety devices, connect Fairbanks with Juneau in the southeast, Anchorage to the south, and Nome to the west. But dozens of isolated trading centers and fishing villages in the interior depend on bush planes for practically all their supplies.

One morning I took off on a typical bush flight with Johnny Lynn, a young Alaska Airlines pilot. Our single-engine Bellanca was crammed with mail packages, rifles, a keg of nails, a truck tire, a baby's high chair, a roll of linoleum, and crates of canned goods.

We droned over desolate reaches of tundra, then wild, undulating foothills streaked by snow gullies. At a small mining camp named Chicken, Johnny eased the Bellanca into a tiny trench clearing fringed by trees. A truck bounced onto the field to receive the mail.

The population of Chicken consists of 12 or 15 gold miners and their families. The children, and many of the grownups, worship Johnny Lynn. Often they hand the young pilot lists of things they need. Johnny fills the orders in Fairbanks, and delivers on his next trip. Many old-timers refuse to go aloft unless Johnny is in the cockpit.

At Jack Wade, another small mining camp, we landed on a thin strip of gravel beside a river. At Boundary, one mile from the Canadian border our "airport" was a mountainside that sloped down for 300 feet, then sharply up.

Johnny's final stop was Eagle, on the Yukon River. Here he drifted over the Yukon, lifted the Bellanca over a 30 foot embankment, and settled down on a former Army parade ground. At each stop frontier Alaskans crowded about, eager for mail and news of Outside.

Most of the supplies which Fairbanks distributes throughout its vast hinterland are shipped from Seattle to Seward, then moved on the 470-mile Alaska Railroad, operated by the Department of the Interior (page 520).

Fairbanks's 40 Eskimos all work on the railroad. They were brought from Barrow and Wainwright on the Arctic Ocean to relieve a wartime manpower shortage. They live in their own colony of shacks near the

Gold Lured Him to Fairbanks; Contentment Keeps Him There

Interior Master's Bustling Metropolis Built on Gold, Plays a Vital New Role in Arctic Defense Strategy

[illegible]

No Jitterbugging in Leighton's Scottdonah Dance Club! Mom, Dad, and Youngsters Prefer Two-step, Waltz, and Scottische

• Wiley, Shot from a "Giant," Smashes a Goldsborough Cliff

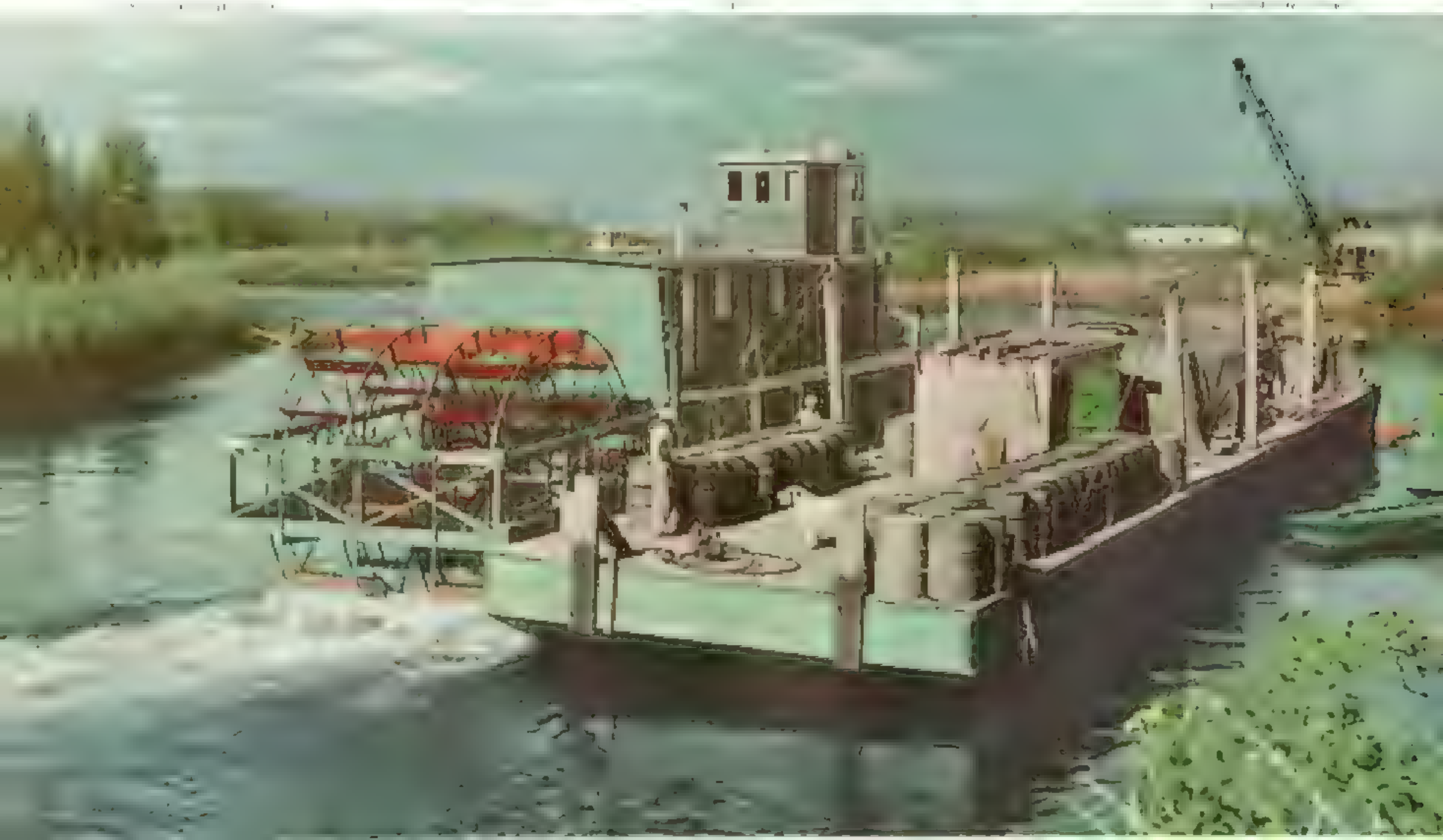
• With Gold Pan and Pick Wiley Leaves Long Lack

"Survival Means Swimming, Even 120 Miles South of the Arctic Circle"

Alaska's Sourdoughs Welcome Some Lovers, but Ignore Others

Summer Warmth Draws Nearby Lake Herding Into a Playground for Fairbanks Swimmers, Anglers and Hunters

Illustration 6. a Stern-wheeler, Plies Between Fairbanks and Yukon Points. Shallow Draft Lets Her "Wake" over Sand Bars



Amid White Men's Trappings, Eskimos Cling to Ancient Customs

Thumb Sucking Helps Ease the Tedium of a Pickaback Journey

railroad yards. I found their homes clean and comfortable.

Their leader, a pleasant cocky elder named Wilbur Hubbard, told me, "As long as we're treated decently, we'll stay. We like it here."

With Wilbur I attended Sunday afternoon Eskimo services at the Presbyterian church. The young white minister paused after every two or three sentences for Wilbur to translate. Most of the men understand English, but some of the women do not.

Fairbanks's second artery to the coast, the 371-mile Richardson Highway, winds from Valdez through a breath-taking panorama of mountain passes, canyons, lakes, and woodlands. It is a gravel road, passable between June and October (page 500).

One hundred miles southeast of Fairbanks, the Richardson is touched by the northern tip of the Alaska Highway.* More and more tourists are driving to Fairbanks from the states. Many bring trailers.

Roadhouses Offer All Services

I talked with a family of four which had just arrived from Seattle. They covered the 3,000 miles in nine days. Their expenses were $213, including $81 for gasoline and oil, $35 for rooms, and $50 for meals.

The motorist can count on a "roadhouse" every 50 or 60 miles along the Richardson and Alaska Highways. In Alaska, roadhouses are informal combinations of hotel, restaurant, and filling station. Their food is delicious, and their sleeping quarters clean.

Most Fairbanks visitors, however, still arrive by airplane from Seattle or by steamship to Seward and the Alaska Railroad to Fairbanks. The housing situation is extremely tight, and so far Fairbanks's tourist trade is below prewar levels.

In my hotel lobby, I was introduced to Bobby Shelton, who made the first automobile drive from Fairbanks to Valdez, in 1913.

"There was only a horse trail to follow," he recalled. "But my Model T Ford then made the 371 miles in 54 hours. The man was up to the hubcaps much of the way."

One of my most stimulating evenings in Fairbanks was spent with Donald MacDonald, a veteran Alaska engineer who helped plan the Alaska Highway. Mr. MacDonald's dream has been a railroad or highway tunnel plunging under the 55-mile-wide Bering Strait to connect Russia and America.

Through the heart of Fairbanks winds the Chena River. A few miles downstream its waters pour into the Tanana River, a major tributary of the mighty Yukon.

Churning stern-wheelers, some patterned directly after historic Mississippi River boats, still carry passengers and freight to isolated trading centers along the Yukon (page 517).

I visited the *Elaine G.*, a small stern-wheeler which delivers freight on barges from Fairbanks to interior ports. Tied to the banks of the Chena near downtown Fairbanks, she looked much like a two-story houseboat.

Women were scrubbing her decks and children romped on the stairways. Men were loading heavy wooden crates onto the two long, low-slung river barges.

"*Elaine* pushes the barges," explained "Doc" Gordon, captain and owner. "We have better control than if we tried to tow them around sharp bends."

Each of the 110-foot barges drew three feet of water and had a freight capacity of 350 tons. They are heavily loaded when *Elaine* shoves off for her six-months' run up and down the Yukon. Sons and sons-in-law are Doc's crew. The whole family goes along.

Another use for the Chena River is log drives. During the winter logging crews slash white spruce out of the Chena Valley for 100 miles upstream.

The drive begins when spring breaks. For six to eight weeks crews armed with pikes and dynamite battle jams all the way to the mill in Fairbanks. An average drive consists of from 10,000 to 20,000 logs.

Despite railroads, trucks, and airplanes, Alaska still leans heavily on the dog team. Hundreds of trappers and traders in the interior have three or four dogs chained near their isolated cabins. During the winter they hit the long, twisting trails to cover their trap lines or visit trading centers.

Many Still Use Dog Teams

Jeff Studdert, a veteran dog-team man, has a kennel on the outskirts of Fairbanks. There he boards sled dogs during the summer. They greeted me with a pandemonium of barking and howling.

Alaskan Malamutes weigh 60 to 85 pounds. A good sled dog can pull nearly 100 pounds for 10 to 12 hours a day.

To keep his own dogs in physical trim in midsummer, Mr. Studdert harnesses the team to a truck. Panting and straining, the powerful Malamutes pull the truck, in second gear, through the streets of Fairbanks.

One of Alaska's greatest dog-team drivers [illegible] of squirming white puppies at his cottage near Fairbanks.

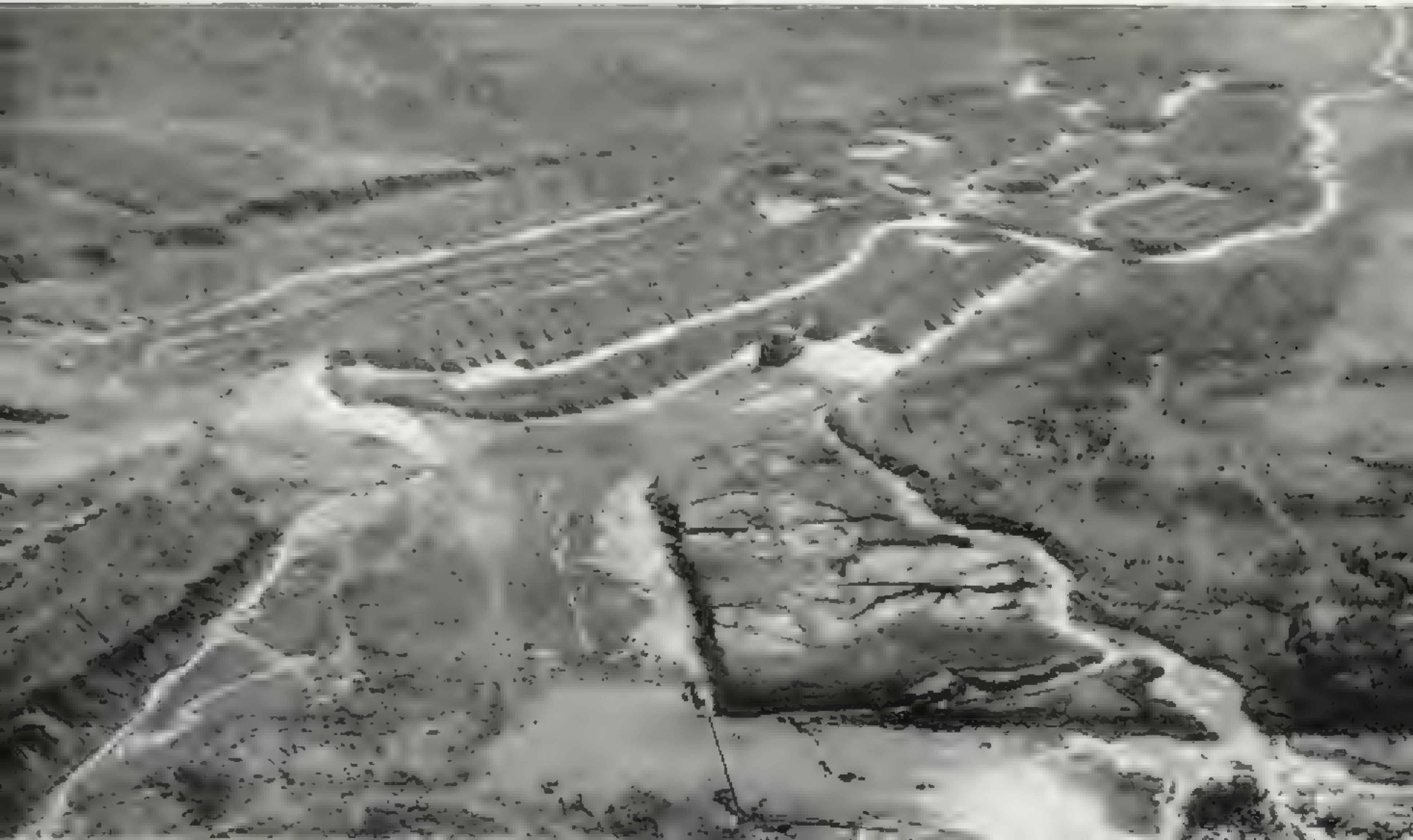
* See, in the NATIONAL GEOGRAPHIC [illegible] "Alaskan Highways an Engineering Epic," [illegible] Rainey, February, 1945.

Across a Snowy Wonderland Runs the 470-mile Alaska Railroad

[illegible]

[illegible]

Long Mounds of Refuse, Free Gold, Pocket-worn Gravel, Pile Up in the Wake of a Gold Dredge Near Fairbanks



Live Steam Shot Through a Forest of Pipes Hews Alaska Ground for Gold Mining

[illegible] hanger, she less workmen to [illegible] summer sun in couple hose leading from [illegible] to [illegible] Into the earth is sediment, pipes are [illegible] and a giant dredge (background) moves to [illegible] gravel. Water jets (pipes [illegible]) are used where "pay dirt" is [illegible]

Seppala, a short, little Norwegian, was drawn by the gold rush to Nome in 1900. During the next 20 years he traveled [illegible] miles by dog team and [illegible] more than any other driver, it is said.

"My dogs are not Alaskan Malemutes," he said. "They are Siberian dogs, smaller than Malemutes, but [illegible] to cold and much less temperamental."

With his Siberians, Seppala [illegible] Alaska sweepstakes three times. The sweepstakes was a grueling 408-mile run over desolate, wind-swept trails, truly the Kentucky Derby of the northland.

[illegible] last long Alaska race was in 1925 when he and his famous Siberians took part in [illegible] by carrying antitoxin to diphtheria-stricken Nome. Since [illegible], Seppala has moved Outside.

[illegible] Highway leads through the heart of the Tanana Valley farming area. Like Matanuska Valley and the Kenai Peninsula, Alaska's other agricultural centers, the Tanana is devoted largely to truck farming and some dairying.

Truck Farming in Tanana Valley

[illegible] 90 days, is overcharged with 16 to [illegible] of sunlight daily during May, June, and July.

Most of the farms are operated by pioneers who homesteaded and cleared virgin land.

[illegible] spring and fall autumn drove some of them back home. And in the early days even a successful crop didn't guarantee a profit, because many Fairbanks grocerymen had year-round contracts with [illegible] to provide [illegible] percent of their foodstuffs.

[illegible] opened a market for everything they could grow. A farmers' marketing cooperative offers additional assurance of a fair return.

Bert Stimple, one of the valley's most successful farmers, [illegible] on a boat from California [illegible] with $400 and a motorcycle

Up He Goes in an Eskimo Blanket Toss at Fairbanks's Winter Carnival

[illegible]

Today he has a wife, a comfortable log cabin, and a prospering potato farm.

Near the Stumpe farm is the hill [illegible] of the [illegible] Alaska [illegible] Territory, [illegible] College [illegible] Alaska [illegible] Experiment Station.

[illegible]

[illegible] during the winter [illegible]

[illegible] Student [illegible] the [illegible] peaks of Mount McKinley, [illegible] North America's highest mountain, [illegible] 57 feet above sea level.

McKinley's north peak, more than 19,000 feet [illegible] was first reached in 1910 by [illegible] sled dogs carrying an American [illegible] doughnuts. Three years later a party of four became the first to climb the higher south peak.

[illegible] of McKinley, I reflected [illegible] Fairbanks, were nothing more than [illegible] Fairbanks and [illegible] its lifeblood today.

Bush planes still use [illegible] and twin-engine [illegible] stages; nearly a winter [illegible] across the tundra [illegible] Alaska [illegible]

[illegible]

[illegible]

Top of the World

The National Geographic Society's New Map of Northlands

THE new National Geographic Society map, Top of the World, covers one-sixth of the earth's surface, and by far the greater part of the world's industry, commerce, and military power is encompassed within its borders.*

The 1,850,000 member-families of The Society who receive the new map with this issue of their NATIONAL GEOGRAPHIC MAGAZINE will find it a useful complement to the large new map in colors of Europe and the Near East that they received with their June, 1949, number.

Drawn on a scale of 1:14,000,000, or 221 miles to the inch, it bears 5,057 place names and gives complete coverage of an area usually found only on two maps, one of Canada and the other of the Soviet Union.†

Here, on a sheet 28½ by 29½ inches, is unfolded the entire picture of the important northlands, drawn from the newest available data.

The tremendous amount of mapping in the far north since World War II is reflected in The Society's new map by much more detail in more lines and shading.

As navigation of aircraft in the Arctic is admittedly difficult, the accurate delineation of coastline is an important aid to pilots.

The U. S. Air Force mapping program has added much to our detailed knowledge of Alaska. Canada has made great strides in the extreme Arctic regions.

Among the Canadian Arctic islands, Victoria has become two islands through the discovery of a strait which cuts off what formerly was mapped as its northeast peninsula. Banks Island's shore line shows extensive alteration.

In the Parry Islands, Borden has become twins, and what formerly was called Isachsen Island has been found to be a peninsula of Ellef Ringnes Island. Bathurst Island has turned out to be an archipelago.

Most spectacular are the large new islands shown in Foxe Basin to the west of Baffin Island, one of which has been named Prince Charles after Great Britain's infant Prince. They lie north of the Foxe Peninsula, which was explored and accurately mapped in the early 1930's.

The National Geographic Society first showed this change on its 1936 Canada map and has added on several later maps other details of the area as they became known. Some charts dated 1949 still show the old conception of the short, stubby Foxe Peninsula, and of an eastern shore for Hudson Bay, also some 15 years out-of-date.

Flights over North Pole Now Commonplace

Flights over the North Pole are commonplace now for the U. S. Air Force. Never [illegible] weather-observation or training plane.‡

In less than a year and a half one Arctic reconnaissance squadron flew over the geographic North Pole a hundred times. Its investigations included study of the extremely complicated northern magnetic area. The new map shows the north magnetic pole as the center of this area at 73° N., 100° W., on Prince of Wales Island.

This unit, the 72nd Reconnaissance Squadron, U. S. Air Force, learned valuable lessons in Arctic aerial navigation and in global flight.

Flying over large glacial areas formerly marked "unexplored" on navigation maps, its planes tested cold-weather equipment and undertook to establish safe procedures for year-round Arctic flights. The squadron exceeded 5,000 hours of flying time and traveled a million miles.

"Flying over the Pole isn't so easy as flying from Washington to San Francisco," one Army flyer pointed out. "It is dreary and unexciting work, but no more difficult than other flying north of the Arctic Circle."

The squadron met with many flying oddities in the far north. Although the average mission was of 20 hours' duration, in summer it was carried out in continuous daylight, and in winter in continuous darkness.

Temperatures at a 3,000 foot altitude frequently were registered at 60° Fahrenheit higher than those on the frozen ground. In winter it was warmer over the North Pole than at the squadron's base, Ladd Air Force Base, Fairbanks, Alaska. In winter skies were clear, with no thunderstorms and little icing. In summer skies always were cloudy.

* Members may obtain additional copies of the Top of the World map (and of all standard maps published by The Society) by writing to the National Geographic Society, Washington 6, D. C. Prices, in United States and Possessions, 50c on paper; $1 on linen, Index, 25c. Outside United States and Possessions, 75c on paper; $1.75 on linen, Index, 50c. All remittances payable in U. S. funds. Postage prepaid.

† Published as supplements to the NATIONAL GEOGRAPHIC MAGAZINE in June, 1947, and December, 1944, respectively.

‡ See, in the NATIONAL GEOGRAPHIC MAGAZINE "Arctic as an Air Route of the Future," by Vilhjalmur Stefansson, August, 1922, and "First Flight to the North Pole," by Lt. Comdr. Richard Evelyn Byrd, September, 1926.

In February and March of this year a six-engined Consolidated Vultee B-36, world's largest bomber, was tested in Arctic flying. At about the same time the United States Air Force was testing radio-controlled bombs near Fairbanks.

Last autumn and winter a five-plane squadron of Boeing B-50's, first of their kind ever tried out in Alaska, spent four and a half months in Arctic flying.

Trained to Survive Rigid Arctic

This winter, for its third season, the U. S. Air Force's Arctic Indoctrination School at Marks Air Force Base, Nome, Alaska, will teach flying officers and enlisted men the techniques of survival under rigid Arctic conditions. Sixty students take the one-week course at one time. More than 1,000 were trained last winter.

Newcomers to the Arctic learn how to build igloos, kill seals and remove their nutritious livers and drive dog sleds; how to recognize safe and unsafe shelter sites in frozen wilderness; how to make fish traps and to dress and smoke game; and how to tan skin and make skin and leather rope.

They are taught also how to distinguish poisonous plants such as the water hemlock, of the parsnip and carrot family, and three varieties of poisonous mushrooms from edible growths; how to operate standard signaling devices like mirrors, smoke signals, reflectors, and rockets under Arctic conditions; and how to establish a position in barren wasteland by sun shadow, duration of day, the magnetic compass, and the stars.

They learn that not Arctic cold alone, but also wind chill makes the north a savage land. A wind of only 10 miles an hour at a temperature of 40° below zero Fahrenheit can freeze exposed human tissue in one minute.

Increased knowledge of Arctic flying has permitted two thrilling rescues from the Greenland icecap in recent years. In February, 1947, the *Ken-Bird*, a B-29, was forced down in remote Dangaard-Jensens Land. Lt. Robert J. Cavenar, flying from Westover Air Force base, Massachusetts, landed beside the wrecked plane and safely removed the eleven stranded members of its crew.

A C-54 transport plane went down on the icecap near Narsarssuak in December, 1948. Lt. Col. Emil Beaudry flew in to rescue the 12 airmen.

Canada and U. S. Operate 150 Arctic Weather Outposts

Both rescue planes were C-47's equipped with skis and jato rocket propulsion units.

In far-northern Canada, in general north of the 75th parallel, the Canadian Government's Department of Transport and the U. S. Weather Bureau now jointly operate four weather stations, with personnel divided equally between the two countries. These stations are located at Resolute Bay on Cornwallis Island, at Isachsen Peninsula on Ellef Ringnes Island, on Eureka Sound, and at Mould Bay on Prince Patrick Island. A fifth, Alert, is planned near Cape Sheridan on Ellesmere Island.

Officers in charge are Canadians and their first assistants are from the United States. The land where the stations are located, all the buildings, and airplane runways for each are owned by Canada. Technical equipment is supplied by the United States.

The U. S. Air Force supplies all these stations with rations, blankets, and other material by air, and removes members of the staff who become ill and need hospitalization. Several appendectomy cases have been rushed out of the far north to hospitals.

Personnel live chiefly in Quonset huts. Neither the United States nor Canada has experienced any difficulty in obtaining an ample supply of volunteers to man these frigid outposts. Women are not included, since there are no facilities for them.

Mainly for its own purposes, the U. S. Air Force also operates meteorological stations such as those at Stephenville, Gander, Goose Bay, and Narsarssuak.

South of the 75th parallel in Canada the Canadians man many stations of their own, and the United States has stations in Alaska. In all, there are some 150 weather outposts in the America Arctic.

Texas northers and Middle West cold [illegible] spring, the result of [illegible] Arctic air which descend in vast sweeps from the North Polar region. The conflict between these cold air currents and warm, moist air from the equatorial belt produces most of our major changes in weather. Thus accurate information from the points where weather originates not only is valuable to our armed forces, but is of extreme importance to a Middle West farmer or an Alberta wheat rancher.

It is also important to everyone who flies. As of July 1, 1949, there were 6,443 airports in the United States, exclusive of flying fields maintained for personal use.

Denmark has taken over most of the weather stations established by the United States in Greenland during the war. It has enlarged and improved them and now makes their observations available to the United

States.* The Danes also are conducting a scientific expedition in Peary Land, at the northernmost tip of Greenland.

For many years Americans have sung of Greenland's icy mountains, but aside from those lying immediately adjacent to its shore line, no one has seen them. If such there be, they are covered by the Greenland icecap.

A French polar expedition led by Paul Victor has just completed its second summer in Greenland in an attempt, among other investigations, to determine the shapes and sizes of some of that huge island's hills and valleys by using sonic devices to penetrate the icecap.

Alaska and Canada Hold Immense Natural Resources

Both Alaska and northern Canada are rich storehouses of valuable minerals.

Alaska has yielded about two-thirds of a billion dollars in gold and another one-fourth billion in other metals, including copper, silver, platinum, tungsten, lead, and tin, since its purchase by the United States in 1867. Mines of the Yukon and Northwest Territories produce some two to three million dollars in minerals annually.

Port Radium at Great Bear Lake is one of the world's greatest known sources of radioactive minerals, but the actual rate of production is a security secret.

Port Radium is connected to shipping on the Mackenzie River by water through Great Bear Lake and River, with a short truck road link near Fort Norman.

At Yellowknife, to the south, on Great Slave Lake, a newly discovered gold field is now a rich producer. Supplies for these two mining areas of the far north are handled largely by air.

Canada has completed a road north from the railroad at Grimshaw to reach Great Slave Lake at Hay River. Winter tractor trails constitute the principal overland supply lines.

Oil is produced and refined at Norman Wells to supply the needs of the mines and local transportation. This oil field is the source of the much-disputed wartime Canol pipe line built to supply oil to the Alaska Highway.‡

The oil derives from an ancient coral reef similar to those being discovered in central Alberta. It is now believed that a series of these oil producing formations may be found in the valleys east of the Rocky Mountains, all the way north from Turner Valley, south of Calgary, to the Arctic Ocean. The new discovery at Leduc, near Edmonton, has further strengthened this hope.

In the Colville River district of Arctic Alaska lies the 37,000-square-mile Naval Oil Reserve No. 4. Since 1944 this area has been extensively explored for oil. Last July the Navy announced that discoveries had indicated reserves far more widespread than expected.

Natural gas deposits, tests indicate, may be in commercial quantity. A well drilled six miles south of Point Barrow will meet all fuel requirements for heating and cooking at Navy installations there.

Five deep wells have been dug and three others are being drilled. All except one have produced "shows" of oil and gas, the Navy announced.

Untapped Mineral Resources

The new map shows one of the most important New World northern discoveries, in the Burnt Creek area along the Labrador-Quebec boundary. Exploration here by the Labrador Mining and Exploration Company Limited, which has rights over a tract of 24,000 square miles, has disclosed an enormous quantity of high-grade iron ore.§

However, before this ore can be marketed, it will be necessary to build 360 miles of new railway from Seven Islands, St. Lawrence River port, to the field.

A complete city and a large hydroelectric plant must be built. Even then, if this ore is to reach the mills of Pittsburgh and the Great Lakes area, a St. Lawrence ship canal likely would be necessary.

Another giant mining project is under way in the south, near the Gulf of St. Lawrence.

Near Lake Allard, 20 miles north of Havre St. Pierre, ground was broken last spring for what may prove to be one of the world's largest high-grade deposits of titanium. Formerly a near-monopoly of India, titanium is a component of high-grade alloys and also of its pigments for paints.

A 27-mile railroad must be built to bring the ore to the docks at Havre St. Pierre. The ore will be refined at a new electric smelting plant to be erected at Sorel, Quebec.

* See "Milestones in My Arctic Journeys," by Vilhjalmur Stefansson, page 543.

† See in the NATIONAL GEOGRAPHIC MAGAZINE [illegible] "Alaska Looks Ahead," [illegible] 15 [illegible] "Opening North," by [illegible] and "Geologic [illegible] Wilson, November, [illegible]

‡ See "Alaskan Highway, an Engineering Epic," by [illegible] February, 194[illegible]

§ See "Quebec's Forests, [illegible], and Frontiers," by Andrew H. Brown, page 431.

Huge mineral areas remain untapped in both Alaska and Canada. As more easily obtainable supplies in the United States and southern Canada are used up, these northern lands will undoubtedly be developed more and more fully. The area now is a "cold storage house" for future industrial materials.

Mining, fishing, and military service take citizens of the United States to the Arctic, but growth there of a stable civilian population is slow.

In all of Alaska, Yukon, and the Northwest Territories the population numbers probably 110,000. Most of the inhabitants are Indians and Eskimo. Only a fraction of the few white residents plan to make their permanent homes in the northlands.

Across the polar sea from the North American Arctic stretches the vast expanse of the Eurasian northlands. Between the two lies tiny Iceland, which stands as a model, demonstrating what men can do at the Arctic Circle.* With few natural resources, its energetic people have turned the little country into a modern nation with good roads, modern industry, and a sound financial position. Iceland became a sovereign state in 1949.

This spirit also is to be found in Norway. Immediately after German capitulation in 1945, determined people returned to their ruined homeland in far-northern Norway and began to rebuild. Largely because of their own efforts, the country has now been greatly rebuilt.†

Norway is pushing a new railway line into the far north. Construction has reached the Arctic Circle and is continuing to the port of Bodo. The Swedish railway system reaches Narvik, Norway, shipping point for Swedish iron ore from the Kiruna region.

Soviet Activity in Northland

In Soviet Russia the new push to the north has reached great momentum.

In contrast to the Northwest Passage, which has been navigated in its entirety only three times, the Northeast Passage has become a busy shipping route in summer.

After some three centuries of intermittent attempts, Baron Nils Adolf Erik Nordenskiöld effected the Northeast Passage in 1878-79. This feat, like Amundsen's Northwest Passage, remained a signal accomplishment for many years.

In 1932 the Soviet scientist-sailor, Otto Schmidt, piloted the icebreaker *Sibiryakov* through the Northeast Passage from Archangel to Bering Strait in two months and four days. This feat resulted in the establishment, by a decree of December 17, 1932, of the Central Administration of the Northern Sea Route. This agency has been the chief force in Soviet Arctic development.

Weather stations, numerous enough to make reliable weather reports and predictions over the whole Arctic route, have developed a technique of predicting movement of the Arctic ice far in advance.

During World War II reports on Arctic weather were exchanged by the United States and Soviet Russia. This exchange has been continued ever since.

The new map shows how the Pechora, Ob, Yenisei, Lena, Indigirka, and Kolyma, all among the world's big rivers, empty into the Arctic Ocean. With their tributaries they afford many arteries which lead in from the main Arctic ship route and penetrate deeply into the vast interior.

In summer products from mine, forest, and field are shipped out and supplies for the many interior centers are brought in. In winter the thick ice converts these rivers into natural highways for tractor trains and other ice-traveling vehicles.

At the mouth of each of these rivers an important town has grown up. New towns in the interior indicate newly opened mines, sawmills, or other industrial centers, many of which have received government supplies of forced labor. Most of them, as shown by the new map, bear names strange to most Americans—Sredne Kolymsk, Tiksi, Verkhoyansk, Magadan, Elgen Ugol, Seimchan, Aldan, and Vilyuisk, for example.

Murmansk, most northern of all the world's large seaports, has probably well over 100,000 population. Served by the railway built in World War I, this port was the most important inlet for the vast Lend-Lease shipments of World War II from the United States and other allies. Murmansk and the railway are outlets for big new mining developments on the Kola Peninsula (Kolski Poluostrov).

Kirovsk and Kandalaksha have both grown into large mining towns. Kirovsk is the center of the rich Khibiny district, which produces copper, nickel, iron, and many other minerals. The world's largest known concentrations of apatite and nepheline lie here.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "American Soldier in Reykjavik," by Cpl. Luther M. Clovis, November, 1948; "Ancient Iceland, New Power of War," 21 ills., July, 1941; "Walking Tour Across Iceland," by Isabel Wyle Hutchison, April, 1938.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Norway Crosses Her Mountain Shell," by Sydney Clark, August, 1949; "Norway, an Active All," by Wilhelm Morgenstierne, March, 1943; "Norway, a Land of Sturdy Reality," by Alfred Pearce Dennis, July, 1930.

The warmth of the Gulf Stream makes Murmansk the only ice-free Russian port except those on the Black Sea. Archangel, an important lumber port which lies five degrees farther south, is icebound in winter. The railway connection between Archangel and the Murmansk line was built during World War II.

The new railway from Kotlas to Vorkuta, another World War II project, taps the oil fields at Ukhta, where radium mines are reported, and the coal fields at Vorkuta, north of the Arctic Circle.

Vorkuta is believed to have 30,000 inhabitants, and Ukhta (not to be confused with Ukhta in Karelo-Finnish S.S.R.) about 40,000.

Igarka on the Yenisei, has become a big timber center, with a population of more than 25,000. The mining center of Norilsk, about 30,000, is connected with the port of Dudinka by a railroad, the world's northernmost, opened in 1938.

Since the beginning of World War II innumerable conflicting reports on the status of the B. A. M., Baikal Amur Magistral, the second trans-Siberian railway, have arisen. The most recent Russian transportation map shows a bit of construction from Taishet to Bratsk.

The other end, from Komsomolsk to Sovetskaya Gavan, and from Komsomolsk to the old trans-Siberian line near Khabarovsk, is well established.

This new trunk line is scheduled to run from Kuibyshev in European Russia to Magnitogorsk, Asmolinsk, Pavlodar, Barnaul, Stalinsk, Abakan, and Taishet.

In the far east, gold mining on the Kolyma River has led to the establishment of new towns and the rapidly growing port of Magadan on the Sea of Okhotsk. The new highway shown on the map connects the gold fields with the port.

This region between the Lena and Kolyma Rivers is known as the cold pole of the Northern Hemisphere; yet at Verkhoyansk, where the temperature sometimes goes to 90° F. below zero, wheat and vegetables grow to maturity. Some melons are raised.

Most of the old Russian Empire is contained in the Russian Soviet Federated Socialist Republic, which is one of the sixteen constituent republics of Soviet Russia.

Table of Airline Distances

The R.S.F.S.R. is divided into six territories, 47 regions, six autonomous regions, and twelve autonomous republics. The autonomous republics are: Bashkir, Buryat Mongol, Chuvash, Dagestan, Kabardino Balkar, Komi, Mari, Mordov, North Osetian, Tatar, Udmurt, Yakutsk.

Great-circle distances in statute miles between 18 important points in North America and 20 in Eurasia are shown in a table especially computed for the Top of the World map.

Comparison of these figures shows, for example, that Washington, D. C., and Seattle are virtually the same distance, about 4,200 miles, from Murmansk, Russia. Within this range from Murmansk lies our greatest concentration of population and industry, extending from the northwest Pacific coast through Minneapolis, Chicago, Detroit, Cleveland, Pittsburgh, New York, and the whole of northeastern United States.

In contrast, conventional shipping distance by land and sea from Seattle to Murmansk, including the crossing of the Pacific and Siberia, measures some 11,000 miles. There is less disparity in shipping distance from New York to Murmansk, because the ship routes closely follow the great-circle route and are only about 400 miles longer than the shortest air route.

The shortest routes from Winnipeg to Igarka or from Fairbanks to Murmansk and Leningrad lie almost exactly over the North Pole.

In the Eastern Hemisphere the borders of the new map extend from Tokyo in Japan to Istanbul in Turkey and through central Europe to the Brittany peninsula. Northern Japan, most of the U. S. S. R. from Vladivostok to the Caucasus, and all of northern Europe from Bucharest to Brest fall within these lines.

The new Russian industrial concentrations in the far east along the Amur, in the Lake Baikal region and the Kuznetsk Basin, in the Urals, and in the Arctic Littoral are accurately mapped.

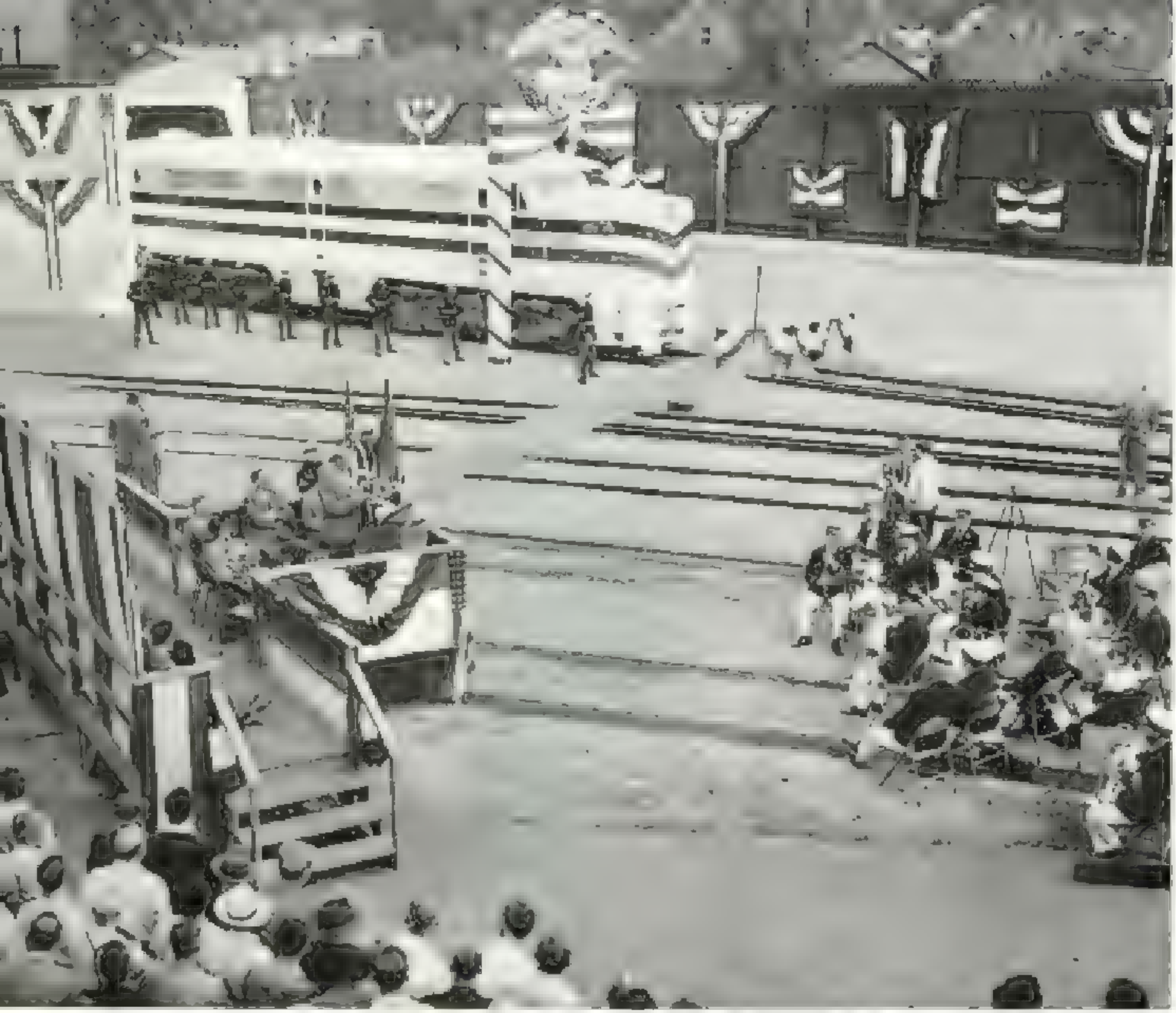
In both hemispheres the far-northern reaches, where East and West so nearly meet, are of particular interest. Until recently men have usually thought of their new frontiers as lying either to the east or west. Special polar charts have been made, but their main appeal was to a limited group of explorers and geographers.

The National Geographic Society's new map graphically portrays for the layman the reasons for the newly heightened interest in this area of the world.

Today East and West are largely developed. The modern pioneer seeks his wilderness to the north or south. The frigid northlands gradually are yielding their secrets to man.

Freedom Train Tours America

The Pride of the Marines Guarded Freedom Train's Treasures on Its 37,000-mile Journey



A Glistening New Steamer Inner Awards Its Glistening "Spirit of 1776"

[illegible]

Sixteen Months Later the 2,000-hp Diesel Electric Rolls to a Final Stop in Washington, D.C.

Declaration Day: Was the 100th Anniversary of the Signing of the Constitution

On a National Geographic Society Map, Marine Guards Trace Their Zigzag Course

[illegible]

This 14th-century Copy of Magna Carta Opened the Exhibit

Mira Lobe, pictured on the [illegible] Magna Carta [illegible]

"... Life, Liberty, and the Pursuit of Happiness ..."

[illegible]

"The World Will Little Note ... What We Say Here ..."

[illegible]

Patient Cleveloaders Weave Snakelike as They Queue Up for the Freedom Train

[illegible]

Visitors Often Waited Four or Five Hours Outside the Train To Spend a Half-hour Within

[illegible]

Running on Presidential Priority, the Freedom Train Streaks Across the Vermont Countryside, Carrying Its Story Throughout the Land

Veterans Reaffirm Their Faith in the American Way by Signing the Freedom Pledge Scroll

[illegible]

[illegible]

[illegible]

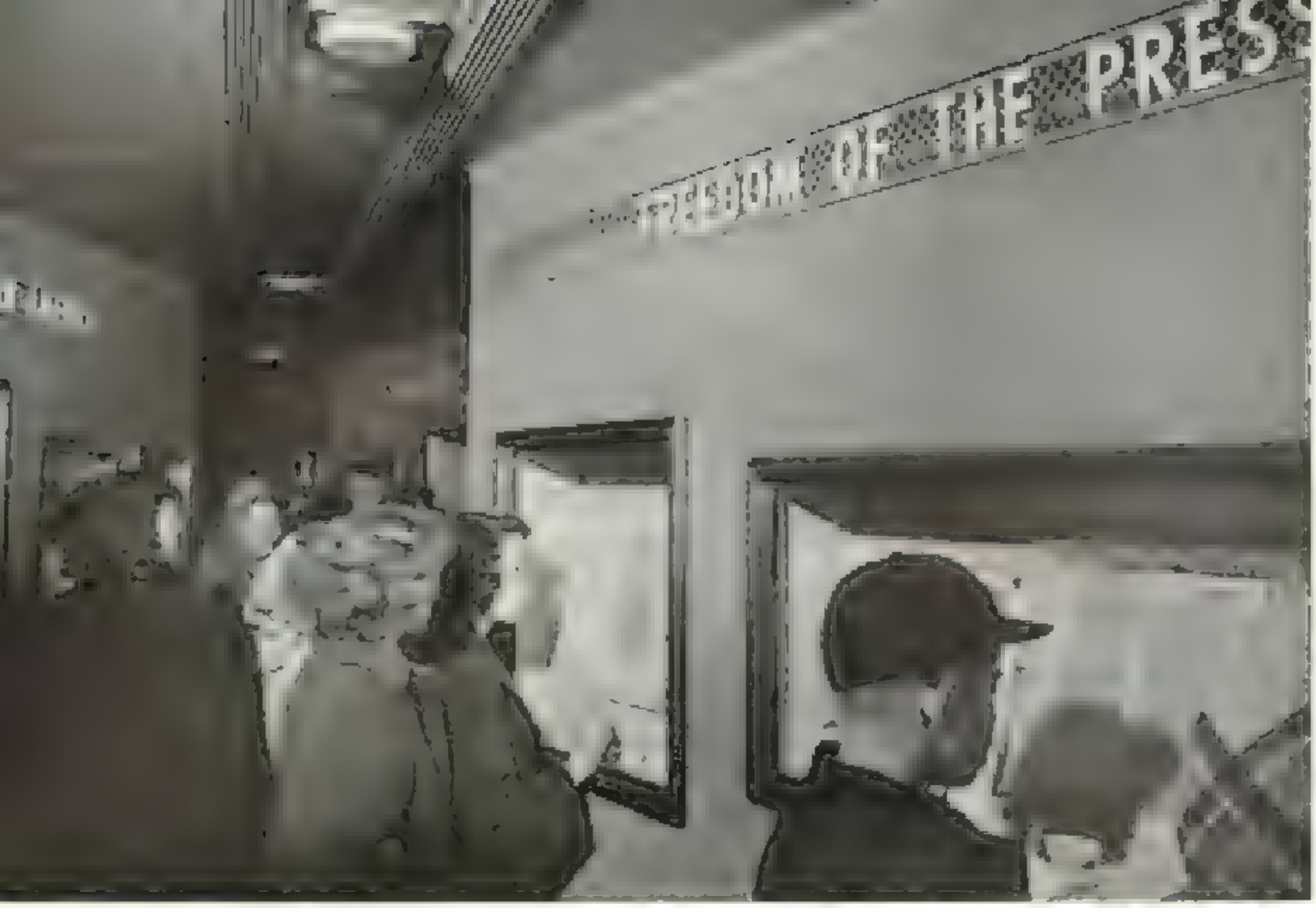
[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

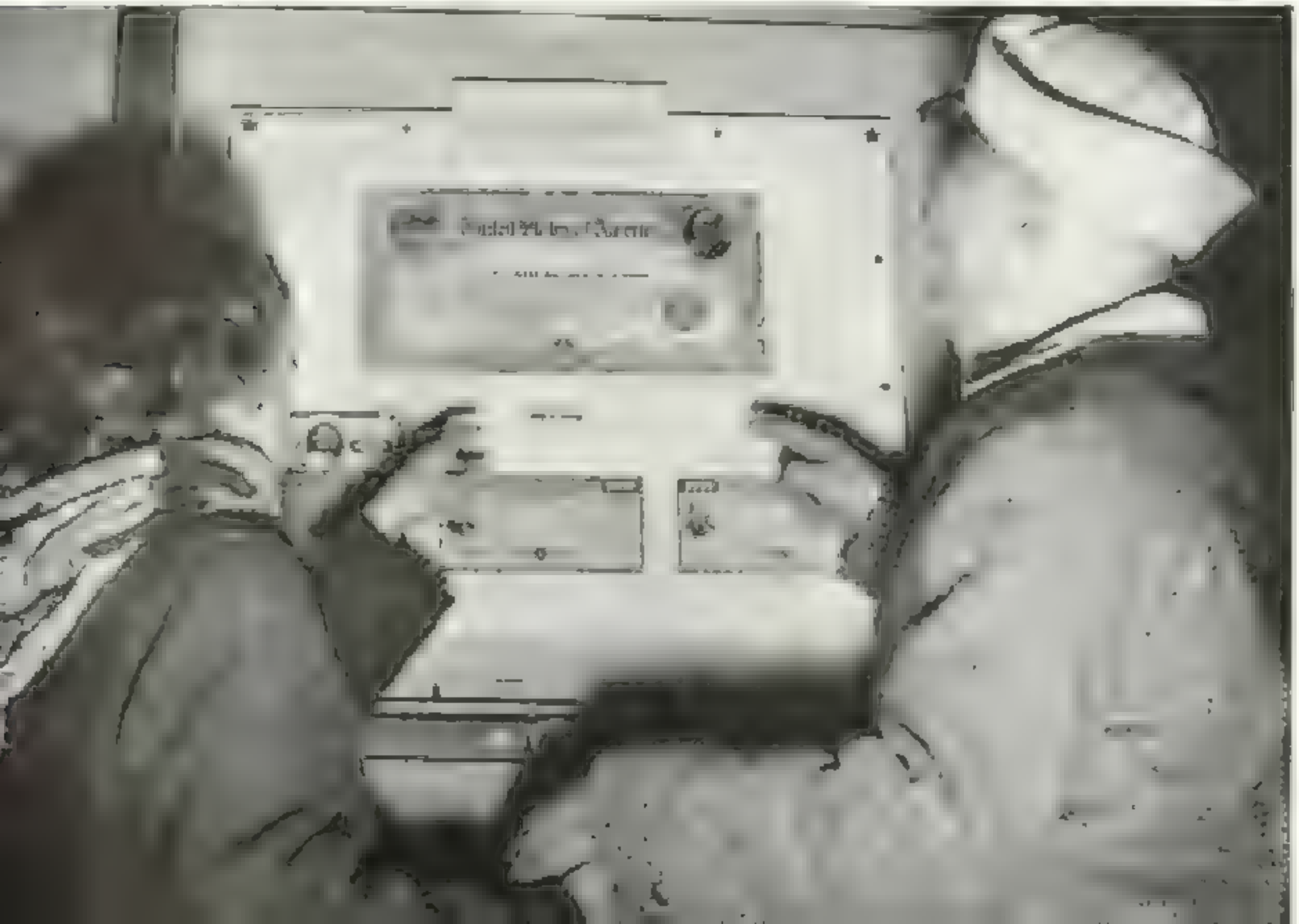


"Crooked" Walls Aroused Curiosity; Encouraged Visitors to "Turn the Corner"

[illegible]

"When You Invest in Government Bonds, You Invest in Freedom"

[illegible]



"Turn the Flag Over Tonight Raised on Iwo Jima"

Tailor-made Luxe Envelopes Were the Documents' Travel Attire

[illegible]

"This Heritage of Freedom I Pledge To Uphold . . ."

[illegible]

Milestones in My Arctic Journeys

By Willie Knutsen

I HAD JUST come back to Boston from one of my Arctic trips when a casual acquaintance invited me to dine.

On my dinner plate, with other delicacies, was a yellow-green mound of wax beans. I lifted a forkful of the vegetable to my mouth. Without thinking, I mumbled half-aloud:

"Mmm-mm! Tastes just like seaweed."

My host arrested his knife, halfway through a slice of beef, and glared at me.

"What did you say, Mr. Knutsen?" His tone was icy as a Greenland glacier.

Confusion flushed my face, for I knew he was offended.

Following the maxim that the best defense is a strong attack, I boldly repeated in a firm voice:

"I said these beans taste just like seaweed."

"That's what I thought you said."

Conversation lagged for the rest of the meal.

Actually, my remark had been a compliment. I like raw seaweed very much, and not just because it's "good for me." It is perhaps the best antiscurvy food that's widely available in the Arctic.

Seaweed is to me just as palatable as—well, as wax beans.

As the saying goes, "It all depends on the point of view." I've found there's nothing that broadens the point of view so much as 12 years in the Arctic.

New Weather Posts Stud the North

Last year I was executive officer, a civilian post, at one of the new Canadian-United States weather stations that stud the Arctic islands of Canada.

My location was Prince Patrick Island, in latitude 76° 30′ N. Prince Patrick is next-to-most-westerly of the huge chunks of land composing the Arctic archipelago of North America.

Like stones in a stream, those islands cause swirls and eddies in the ice-jammed ocean currents which ebb and flow between Baffin Bay and the Arctic Ocean.

Never before has attention been so sharply focused on the air and sea frontiers of the circumpolar "land crown."* There Eurasia and North America face each other across ice-locked seas. Until recently the rigors of those wastes have held at a distance all but explorers, adventurers, and a few Daniel Boones of science.

My assignment to Prince Patrick Island was only the most recent milestone on the long, long trail of my 12 years in the far north. I hope that when I come to the end of that trail, I'll look back on that experience as one of my *earlier* Arctic adventures!

That wish reveals my plight: I am hopelessly—and happily—caught in the siren toils of the North.

The Arctic is tremendous. So far, men have made no more impression on it than would a mouse nibbling at a whale. One still can travel a thousand miles in the far north and never see a trace of human activity.

New Island, Nearly as Big as Connecticut

An island 4,100 square miles in area (nearly as big as Connecticut) was discovered just last year (1948)! Prince Charles Island was found, not in remote high latitudes, but in Foxe Basin, just north of Hudson Bay.

Yet in this "backward," almost unpeopled Arctic, I've sat with tawny Indians, just off the trap lines, on swivel chairs in an Army post exchange. We were drinking Cokes and sodas, not black tea or hot deer fat.

Between the Arctic Circle and the North Pole jeering "cat" skinners have clattered past me, as I thrust along on skis, in vehicles ranging from huge tractors to nimble snowmobiles.

I've watched Eskimo in Baffin Island shuffling contentedly around a juke box. They had no trouble keeping time to music written to tempt terpsichorean talent in Hollywood and Harlem, not in snowy wastes north of the Arctic Circle. Between dances they nibble popcorn and ice cream.

In my wildest boyhood dreams I would never have tolerated the thought that one day I would do military duty in the North as "Officer in Charge of Pigs"!

A Norwegian Born in Brooklyn

To hear me talk—in accents of the Hansens, Olsens, and Nilsens—you'd never guess I was born in Brooklyn. But I was, within a harpoon's throw of Prospect Park. Both my parents were Norwegians (page 544).

When I was a year-and-a-half old, my mother took me back to her home in Tromsø, north of the Arctic Circle. That's where I spent half my young life, among the fjords, tundra, and stark mountains of Europe's attic.

My earliest travel experiences were among the colorfully clad nomad Lapps. As a boy I visited their summer camps near Tromsø.

In 1932 I made a summer crossing of Lapland from the Norwegian coast, through Fin-

* See "Top of the World," page 534.

Paul Helsvoort

In Solitude Cold the Author Thinned Paints with Gasoline

While Knutsen studies his ship, crewed, frozen in the ice at Loch Fyne, east Greenland (page 549). It is March and the temperature 25° below zero. Knutsen found unthinned paint so stiffened by the cold that it could not be applied. From Lapland came his coat of reindeer skins; his French shoes are of the same material. A Norwegian fur lined sealer's cap keeps his ears warm.

ish Lapland, and into Swedish Lapland.*

The clouds of mosquitoes and black flies darkened the sun like smoke from a forest fire. There were two of us, a Swedish student and I. We were frequently up to our waists in the swampy tundra and had to wade a hundred streams.

On my return from this trek I developed a bad case of bronchitis. The doctor said I'd be wise to give up wilderness travel and settle for a white-collar job.

I hope he reads this!

My love of the outdoors and of the tough, self-reliant people who live at civilization's fringe translated itself into a desire to paint and carve these folk in their life's setting.

It was not long before I found myself in that paradise of Arctic artists—Greenland.

At the beginning of my Lapland trip I had met Count Gaston Micard. He was setting out on a summer trip to ice-capped Greenland, the world's largest island, belonging to Denmark.

"Would You Like To Go to Greenland?"

"Willie," he said, "I am going to make a winter trip to Greenland one of these years. Would you like to go?"

I swallowed hard and said, "Yes, sir! I'd do anything to get there."

In 1936, when I was 24 and an art student in Durham University, England, I saw a newspaper story announcing the imminent departure of Count Micard on a year-long expedition to northern Greenland.

I wrote to him at once, reminding him of our conversation four years earlier. Could he use a good man on the trip?

A week later I had to return to Oslo, Norway. I found a job in an architect's office. On a Monday morning I reported for work. Five minutes after I sat down at my desk a telegram was handed to me.

"Come immediately." Signed: "Micard." The wire came from Tromsø.

A week later, architecture forgotten, I was at Micard's side as we sailed out of Tromsø headed for northeast Greenland.

Our vessel was Sir Ernest Shackleton's *Quest*; Count Micard had chartered it from

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Nomads of Arctic Lapland," by Clyde Fisher, November, 1938, and "Lapland's Reindeer Roundup," 14 color photographs by Cyrian Arnold, July, 1949.

Ringed Across Europe Ship from Norway Brings New Weather Observers to Greenland

[illegible]

the Norwegian [illegible] had been built from its British owners (page [illegible]).

[illegible] Greenland and [illegible] bergs (page 552).

At Cape [illegible] Gulf (Golf) the *Ob* [illegible] Norwegian [illegible] but

Karl and I planned to trap foxes and hunt seals and walrus for [illegible]

Then the *Ob* sailed up to the head of Inch Lyne fiord and froze in for the winter. Members of the ship's party also spent the winter trapping foxes.

Of our catch, 90 percent were white foxes, 10 percent blues, the latter [illegible] than the whites.

The crop of foxes and other wildlife in the Arctic seems to depend, to some extent, on the prolificacy or scarcity of lemmings.

[illegible] small, mouse-like rodents that in some years infest the northern tundra by the million. The cycles of their abundance are [illegible] present a biological puzzle.

In the early fall Karl and I found lemming burrows dotting the tundra like holes in a Swiss cheese.

Lemming Army, Locked in Ice

The first sharp October freeze laid a clear skin of ice on the bays strong enough to support [illegible] and our sleds. Karl and I crossed to the west shore of Godthaabs Gulf next day [illegible] trapping for foxes. The [illegible] so clear we seemed to be gliding over [illegible] water.

[illegible] Robert A. [illegible] Magazine, July [illegible]

Even on the Deck of the *Quest*, Count Micard Put Up His Umbrella

[illegible] Micard, leader of two Greenland [illegible] World War II [illegible]

[illegible]

Author Sits on the Musk Ox That Nearly Killed Him by an Unexpected Charge

While Mr. Knutsen was quietly painting near Cape Swech, this east Greenland [illegible] [illegible] [illegible]

There were double-deck bunks for Karl [illegible] and a single bunk for [illegible]

[illegible] St. Bernard. He would [illegible] great [illegible] on [illegible] the table and eat from a plate [illegible] Karl and me.

[illegible] Norwegian [illegible] was a [illegible]. He had been with a [illegible] lady in [illegible] who had [illegible] him [illegible] and chocolate creams. No wonder he weighed [illegible] pounds!

When we first went ashore in Greenland [illegible] was afraid of his own shadow. The [illegible] dogs [illegible] the first musk ox we encountered, snarling, barking, and wagging their [illegible] with the [illegible].

Not [illegible]. He put his tail between his legs and made sure I was always between him and the [illegible].

[illegible] When [illegible] he would [illegible] on his back and [illegible] would [illegible]. Yet [illegible] these [illegible] creatures [illegible] him, [illegible]

[illegible] we accepted the [illegible] that [illegible] was a [illegible] among [illegible].

[illegible] and I wandered

By the Light of the Midnight Sun Garrett Mason Drives His Dog Sledge to Cape Mary's To Hunt Walrus

[illegible]

Shackleton's Old *Quest* Lies Beached on a Greenland Fjord

Puppies Replace Dolls and Teddy Bears for Eskimo Youngsters near Angmagssalik

[illegible] from which this crude [illegible] drift wood, probably from Siberia. The [illegible] the island [illegible] Eskimo children

[illegible] of the mountains.

Having lost [illegible], we weren't interested in hunting. A lone [illegible] stood motionless, as if cut in granite.

We climbed a mile or so to the top of a [illegible] to sketch in the lofty lines of snow-patched peaks. Labb snoozed at my side.

Suddenly I heard the clatter of hoofs behind me. Wheeling about, I saw a musk ox [illegible] charging head down. The animal's heavy [illegible] blue-brown hair quivered with each stride.

Musk Ox Charges, Gun Jams!

With a single motion I dropped my crayon, swept up my rifle, and slammed back the slide to cock it. In my frightened haste the shell jammed in the chamber!

[illegible] sense told Labb that [illegible] his usual character, he flew to meet the [illegible] for the [illegible] creature's throat.

[illegible] stop and lick his [illegible] attacker, Labb [illegible] hitting Labb, and fired into the beast's ear.

[illegible] and his master, growling at the animal and jumping up on me to lick my face.

"[illegible] gave the dog a [illegible]

The musk ox was a female. We followed her tracks back over the brink of the hill. Part way down the [illegible] turned from the big cows and started up.

It was clear what had happened. [illegible] Labb and me [illegible] the mother had [illegible] the youngster at her side [illegible] and sent it [illegible] back down to the herd. Then she rushed up to the plateau, determined to destroy the enemy that she fancied [illegible] her calf (page 547).

A year later, when I was back in Greenland, I met Alwin Pedersen, authority on the musk ox. He was [illegible] Count Figl Knuth. I told him about the [illegible]

"Absurd!" he said scornfully. "No musk ox ever charged a man. You must have dreamed it."

Two days later Pedersen and I and a few dogs came suddenly on a small herd grazing in a grassy swale. When danger threatens (usually attacking wolves), musk oxen ordinarily form a tight defensive ring, rumps together and massive heads with heavy horns lowered outward toward the enemy.

On this occasion the animals were strung out feeding. Pedersen clapped his hands, expecting the sharp cracks to scatter them from our trail. But all nine fooled him and charged us instead!

I I never forget the look of bewilderment on Pedersen's face. He was witnessing the upset of a principle as incontrovertible to him as the rising and setting of the sun.

Quickly recovering from his shock, Pedersen joined me in cutting the dogs loose from their lines. The bare-fanged canines stopped the galloping musk oxen. Instinctively they went into their protective football-huddle-in-reverse.

Dog Friendship Is Precious

The importance of dogs as companions in the North can't be exaggerated. Many a traveler who would surely have gone out of his mind with loneliness has found comfort and fellowship in his dogs.

Good dogs always are alert in an emergency.

Gerhard Antonsen was the most famous trapper in all northeast Greenland. The Scandinavian hunters knew him as the "King of Kevet" (Kevet was the location of his main cabin).

Antonsen was marooned by a bad storm at a hut far up Tyroler Fjord. The wind raged that night and finally broke the door catch. The King pulled out his *tollekniv* (Norwegian sheath knife) and stabbed the blade into the door frame to hold the door until he could fashion a new turning catch.

Antonsen found a piece of wood and sat down to the job. A mighty gust of wind struck the door like a sledge hammer. The knife was torn from the door frame and with diabolic aim flew across the room and pierced Antonsen's left eye.

With a shriek the King came to his feet and pulled the offending weapon from his eye. Blood poured down his cheek.

But the worst thing was that he could not see even with the undamaged eye. In some strange sympathetic paralysis, the right eye was as blind as the knife-split left one.

Antonsen collected his nerves from the frightful shock. Early in the morning he piled his sled with blankets and furs, hitched up his dogs, lay down on the sled, and told the faithful animals to go home.

Hours later he was delivered to his main cabin, where he fumbled around until he found his first-aid kit. He dressed the wound and resigned himself to waiting for help. He still was totally blind.

The King had made an arrangement with the Danish weather station at Eskimonæs (Daneborg) to come looking for him if an unusually long interval passed since his last visit. Eskimo soon found the hut at Kevet and took him to Eskimonæs.

Under competent care Antonsen regained sight in the injured eye. When he went home to Norway for further treatment, the doctor was able to give him back limited use of his left eye also.

"You know," the doctor told him, "if that accident had happened in the city, with bacteria and irritants in the air, I doubt that we could have saved your sight."

"Doctor," Antonsen said, "if I hadn't had the help of my dogs, I doubt that I would be *alive* today!"

During that winter of 1936-37 Karl and I made three trips up Lack Fjord to where the *Quest* was ice-locked near the shore. I used to wander over the hills with Count Micard, certainly one of the kindest and most considerate of leaders.

Count Micard Had Been Everywhere

Micard had been everywhere. He had a restless hunger to see far places.

Moreover, Micard was a profound man. I've seen him sit for five hours at a time in one spot, just drinking in the moods and aspect of the immense Greenland landscape.

Like many out of the-ordinary men, Count Micard had eccentricities. Wherever he went, he carried a silk umbrella patterned with streaks and splotches like a World War II jungle camouflage suit (page 546).

For his trips behind the dog team he had the men make him a sled with two armchairs, set back to back in the middle. One faced forward, the other aft. When sun or storm beat too rudely in the Count's face, he moved to the other chair and turned his back on the elements! (Page 548.)

Many a Paris restaurant might have picked up tips from the food served on the *Quest*. Count Micard brought with him a Norwegian cook who had been specially trained in French dishes.

Soufflés, mousses, and crêpes suzettes made our mouths water, but were so taken for granted that no eyebrows lifted when they appeared on the table. Yet one of Count Micard's favorite dishes was raw polar-bear meat, ground up like hamburger.

Millions of Tons of "White Lava" Spilt Through Gaps in Greenland's Mountain Wall

Icebergs Calve from the Glaciers and Set Out on What May Be a Long Voyage

[illegible]

Slim Kayaks, Built for Work, Also Serve for Play

[illegible]

In 1938-39 Count Micard and I returned to Greenland. We were co-leaders of what we called the Norwegian-French Expedition to Northeast Greenland.

Our ship was the *Kingerd* (*King Seal*) renamed the *En Avant* (*Forward*) in recognition of Count Micard's support (page 543). In the summer of 1938 we sailed to the Greenland coast in the vicinity of Clavering Island. Then we turned north inside the pack ice.

This was the region where the U. S. Coast Guard and Army played cat-and-mouse a few years later during World War II with invading German weather observers. With the help of Danes of the Greenland Sledge Patrol, the American forces finally harried the last of the Nazis out of the country in 1944.*

Shelf Ice Forms Landing Stage

To set up our main outpost, called Micardhu (Micard Hut), we sailed the *En Avant* along the coast of Germania Land to about latitude 77° N. Tying to the land fast ice (the [illegible] that stays locked to the shore often for years), we unloaded tons of supplies and equipment.

The ship wintered some 30 miles to the south at the north end of Store Koldewey Island.

From Micardhu we transmitted weather reports three times daily by radio to Norway via Spitsbergen. Two scientists directed studies of cosmic rays, the aurora borealis, and earth radiation (heat loss to the atmosphere).

We built a hut at Thomas Thomsen's Nose, north of Micardhu, as a jump-off place for sled trips north along the coast.

On reaching the cabin one day, I found about 40 packages of our favorite goat cheese scattered around half an acre of snow. There was a hole in the hut almost big enough to walk through standing up.

The marauder obviously was a polar bear. He had happened to stumble upon the goat cheese cases, and had thrown them outside, broken open every separate paper package, and taken a generous bite out of each one!

We killed ten polar bears that winter. Four of them we got with gun traps.

Near our unmanned food depots we set a box, open at one end, on legs to lift it above snow level. Into the closed end of the box we inserted a sawed-off rifle with the stock removed. To the trigger was attached a cord that led to a chunk of meat placed in the center of the trap.

A curious and hungry bear would put his head in the box to grab the meat, thereby pulling the trigger string—and adding a bearskin to our collection.

Polar bears are magnificent animals. We killed them only for food and to keep them from molesting our supply dumps. Their strength, courage, and cunning are proverbial (page 487).

I've heard a number of well-documented stories of polar bears attacking human beings. Usually such attacks are provoked. There was, however, the sobering and tragic experience of the artist John Tutein in east Greenland.

Tutein had taken his canvas out to the lip of the land-fast ice on Cape Broer Rygs in the summer of 1921. With his back to the shore, he painted the scene of icy seas and distant mountains.

Tutein's brother, Peter, in a cabin a mile or two away on the shore, happened to look out the window and saw a bear plodding up behind the preoccupied artist. Before Peter could move to shout or fire a warning shot the big white beast smashed John's head with one swipe of a mighty paw.

Christmas Dinner, Delivered "on the Hoof"

On Christmas Eve at Micardhu we cleared the supper dishes from the table, and the cook began to set it for next day's holiday feast.

"Hope you boys aren't too hungry," he said. "We've eaten up all the fresh meat. [illegible] and rehydrated vegetables."

Someone who'd stepped outdoors came bursting in, shouting:

"There's a musk ox stumbling around in the dark just outside the hut! Pass me my rifle!"

With what a glow of wonder and gratitude we feasted next day on the musk-ox steaks so providentially provided!

In May of 1939, just as we were laying detailed plans for the summer's explorations, Count Micard fell ill of some strange malady we weren't able to treat. We radioed Norway for help. The *Veidekari* hurried westward to our aid. It carried a small seaplane.

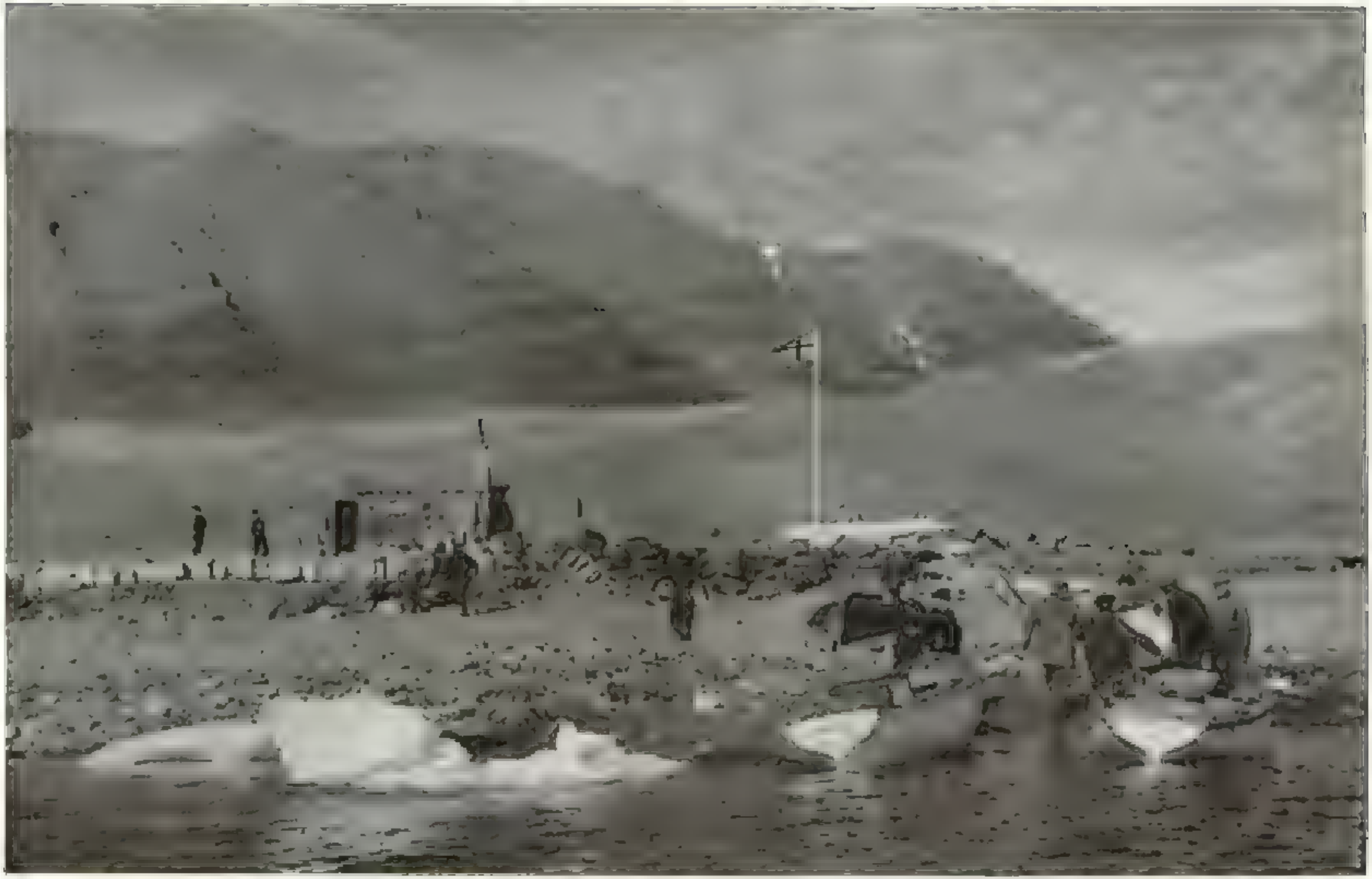
The *Veidekari* approached as close as it could south of Shannon Island. The plane landed among the floating ice off Micardhu and evacuated Micard and me to the ship.

Thanks to the prompt transportation and material aid, the Count made a speedy recovery back in Norway. Meanwhile, I tried

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "American Sled Guard in Greenland," by Andrew H. Brown, October, 1946; "Serving Arctic [illegible] by Robert A. Bartlett, May, 1946; [illegible] to America," by James E. Pennell, [illegible] and color illustrations in September, [illegible]: [illegible]

An Ice River Wrinkled with Age Slowly Moves Away Leaving Piles of Rocks Beyond the Weather Station

[illegible] Cape Cod Air Force [illegible] Cold War [illegible] World War II [illegible] Northern [illegible] Greenland [illegible] North America [illegible] North America



Once a Year This Lonely Beach Bustles with Activity When the Ship Comes To Exchange Supplies for Furs

[illegible]

to get support for a second year for our Greenland expedition.

But it was the period of Munich and the verge of war, and we had to call back the boys from Greenland and wait for more tranquil times.

I Escape from Norway

In April, 1940, the Germans invaded Norway.* In July I managed to get away for Greenland in the faithful *Ringsel*, her old name restored. The Nazis apparently were afraid to interfere with the expedition because I, the leader, was an American citizen.

I haven't been back to Norway since that fateful summer.

Our first stop was at Angmagssalik. It and Scoresbysund are the only two important towns in east Greenland.

Capt. (now Rear Admiral) Edward H. ("Iceberg") Smith, on Greenland Patrol in the U. S. Coast Guard cutter *Northland*, dropped anchor there, too. Learning I was an American citizen, he offered to arrange for me to go to the United States.

Captain Smith took a dim view (as I must admit I did myself) of my returning to Nor- [illegible] of the Nazis.

Because I'd been lucky enough to be born in Brooklyn, I was taken to Julianehaab, southwest Greenland, transferred to the U.S.S. *Campbell*, and landed safely in New York.

Back to the North Again

After marrying an American girl, after a year in Juneau, Alaska; and after my first child, a girl, was born, I was commissioned a Second Lieutenant in the U. S. Army Air [illegible] in May [illegible] and [illegible] for the Arctic again.

I was assigned to the Arctic Search and Rescue section of the Air Forces. After a period of training, I was sent north to the new airfield at Frobisher Bay on Baffin Island.

Baffin Island is north of trees. In summer Arctic shrubs leaf and wildflowers bespangle the hills. In winter the land is a desolation of rocky emptiness, ridged with snowdrifts and dotted with blue-green ice where gales have swept clear the hundreds of small lakes.

Despite its wild, inhospitable setting (or perhaps because of it!) Frobisher Bay generally was considered the preferred far-north military station during the recent war. Here was the camaraderie of a frontier outpost. The GI's liked the freedom from spit-and-polish soldiering.

It was a small base manned by just enough men to do the job. That job was operating a landing field and sending out weather reports to stations making forecasts to aid the heavy flights across the North Atlantic.

Part of my duties was to take charge of the kennels where we kept our Huskies always ready for a possible rescue mission, should a plane be forced down in our territory.

Once I had to take a new cook overland to Lake Harbour to replace an ill soldier who had the chow chore. It was in the bitterest time of the winter, January, 1944.

We set out with two teams of 12 dogs each. The new cook lay bundled up on one sled.

It was a grueling four-day trip. The temperature the second night dropped to 54° F. below zero. At suppertime we were half frozen after building an igloo to sleep in. We tapped a bottle of medicinal spirits that we carried for emergencies. It was frozen to slush.

Long Walk Saves a Cook

The second day the new cook said he wouldn't go any farther. If this was the Army, he'd take it in the swamps of New Guinea. So he said!

I spoke a little more roughly to him than the book allows an officer to do. Then I lifted him out of the sled, where he lay bundled in a blue funk, and told him to get moving.

"If I lay shivering on a sled, my blood congealing from inaction, I'd be ready to give up too," I told him.

That cook *walked* the rest of the way to Lake Harbour. When we arrived, he took my hand.

"Thank you, Lieutenant," he said. "I'm sure glad you made me stick it out."

"That's all right," I answered. "I've felt like quitting plenty of times myself."

In the summer of 1944 I went to Goose Bay, Labrador, as commanding officer of the Search and Rescue unit at that important ferrying base. Thousands of bombers stopped off at Goose Bay during the war en route to the battle fronts of Europe.†

With that tremendous air traffic, and because most of the pilots were relatively inexperienced youngsters, it was inevitable that a few planes should come to grief in the utter wilderness that surrounds Goose Bay for hundreds of miles (page 568).

If our missions were sometimes sad ones,

* See, in the NATIONAL GEOGRAPHIC MAGAZINE "White War in Norway," by Thomas R. Henry, November, 1943; and "Norway, an Active Ally," by Wilhelm Morgenstierne, March 1943.

† See "Newfoundland, Canada's New Province," by Andrew H. Brown, NATIONAL GEOGRAPHIC MAGAZINE, June, 1949.

Gossiping, Nursing, Pipe Smoking: Greenmarders Love To See and Be Seen

[illegible]

[illegible] Wed harpoon [illegible]

[illegible] and [illegible]

We passed the pyramidal tips [illegible] trees. But the [illegible] and hoar. Many a fat goose and duck [illegible] the cook pit at our camps deep in the forest.

[illegible] changes in the [illegible] cultures [illegible] were [illegible] enough to let me do war work for which I [illegible] not by training and [illegible]

[illegible] Just [illegible] Bale [illegible] Greenmarders [illegible] between Gouldsboro and the [illegible] of St. Lawrence.

A [illegible] from Maine [illegible] trouble [illegible] the world in Newfoundland and the Gulf of St. Lawrence. The pilot had ordered the crew to jump by parachute, as the plane was losing altitude through a thick overcast.

[illegible] five of the nine men had jumped, the plane [illegible] and the pilot [illegible] to nurse it back to Maine. He gave the approximate location of the area where [illegible] men had leaped. That's all we had to go on.

Campfire Smoke Locates Men

[illegible] started in the search. From [illegible] we spotted a campfire in the hills [illegible] we picked up [illegible]

"Where are the men?" I asked.

"Where [illegible] these [illegible] men? [illegible] We [illegible] the other [illegible] of them.

After calling for these men to Mingan, we were looking for the other two. One of the [illegible] had told us where to look, for the [illegible] trees.

We caught sight of the chutes near a tiny [illegible] lake. I told the pilot of our [illegible] "Norseman," and [illegible] "sit down" in the [illegible]

With one of my men I set out for the parachutes. [illegible] to find clues near [illegible] the two [illegible] Newfoundland that back for [illegible]

Next morning we [illegible]

Plowed Deep and Doorstep Are "Home" for a Family Pioneer

[illegible] the [illegible] could [illegible]

[illegible] The plane came humming back from Minguan.

A pilot had to land short on that pond lest he run into the cliffs on the opposite shore. The Norseman unfortunately with a pilot [illegible] the water [illegible] over [illegible] back.

We ashore watched horrified, but were relieved [illegible] three men crawl out on the [illegible] [illegible] water.

With no [illegible] [illegible] rubber life raft. As we paddled out to the wreck we noticed our flimsy craft was filling with water. It leaked.

When we reached the [illegible] plane, we pushed out the raft [illegible]. Hastily [illegible] we at last [illegible]

The pilot was hurt. We signaled a plane flying above, not a floatplane, to send in another. [illegible] take out the injured man.

Finding no trace of the two still-missing chemists in the vicinity where we knew they had come down, we had no choice but to drag the lake. We found them.

A later rescue in this [illegible] and lake region [illegible] an amusing [illegible]

One of two men who [illegible] from a [illegible] plane was quickly rescued, the same day that the accident occurred.

We located the second man on the side of a [illegible] and pick him up. We [illegible] his chute and he there when we [illegible]

We [illegible] of water on a shallow stream, the water closest to the hill. When we reached the collapsed parachute our "victim" was nowhere in sight.

We [illegible] through the evergreen thickets to the stream.

"I Like It Here"

[illegible] of the plane pontoons. His bare legs were dangling in the water. When we came within talking distance

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"I Like It Here"

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[illegible] Hi [illegible] and [illegible] a [illegible] greeting.

"You fellows came too soon [illegible] I thought it [illegible] in this country. Had the best time I've ever had in my life. Wonderful fishing. I shot a couple of ptarmigan with [illegible] I like it here."

Our jaws dropped. We sat down [illegible] pantoon for a [illegible]. Presently our [illegible] new acquaintance spoke up again.

"Well," he said, "guess there's still a war on. Let's go."

Back at Goose Bay, tragedy and comedy both played a part in an almost incredible incident.

One afternoon a friend and I were chatting in the Operations building. We [illegible] heard an explosion up in the sky at the same instant. Running out, we [illegible] a Mosquito [illegible] tumbling down [illegible] of its parachute.

Hour After Hour the Seal Hunter Waits for His Quarry

[illegible] waited in [illegible] Mosquito [illegible] Seal [illegible] Hour after hour [illegible] patient [illegible] search. But if a seal comes up for air, the hunter will [illegible] He will hail the quarry and with the [illegible] have it home to the table.

Then I was amazed to see an open parachute drift out of the [illegible] below it. But when the chute had been [illegible], I saw also that the man was [illegible] the shrouds of the chute and was dropping head down!

We [illegible] into the nearest jeep and drove [illegible] across sand, concrete, and [illegible]. As luck would have it, the [illegible] was plummeting right toward the [illegible] of one of the great concrete runways.

Braking the jeep to a screeching halt at the spot where it seemed the chute would drop, I shot out of my seat and rushed to intercept the falling trap.

Just as the flyer's head was about to strike the paving (the blow would almost certainly have been fatal), I managed to flip the plummeting figure over by the shoulders. The luckless chutist struck on his rump instead of his head and was only bruised. He was soon completely well again.

When the Mosquito had exploded, one of the two-man crew apparently had been killed instantly. The pilot had been knocked unconscious. When he came to, he had found himself fading with his parachute pack [illegible]

Early Explorers Found Their Way Through Mount Bundas—Now the Peak Guides Planes to a Nearby Airstrip

Across Drifted Snow at Resolute Bay, Cornwallis Island, a Tractor Hauls Quonset Hut Parts for the Canadian-American Weather Base

Visitors Come Ashore from an LCVP at Stone Land, Only 675 Miles from the North Pole. Cargo Sled Makes a Bridge Through the Surf

[illegible]

Red Cabins, Tiny Boats and Striped Pantaloons Are Fashion "Musts" in Greenland

[illegible]

Snowy Owl's Long, Dense Feathers Grow Right to the Tips of Its Toes

[illegible]

[illegible] place. [illegible] Second [illegible]—[illegible].

[illegible] the [illegible] of the [illegible] into the helpless [illegible] down [illegible].

"Perfection in Search and Rescue"

My superior [illegible] a formal [illegible] perfection in search and rescue [illegible] before [illegible].

The American commanding officer at Goose Bay during most of my time there was the [illegible] North [illegible] Lt. Col. [illegible].

[illegible] While at Goose Bay [illegible] to wander into every [illegible] of his base. He discovered that the mess hall [illegible] tons of [illegible] every day.

One morning Colonel [illegible] called me into his office. He was very stiff and businesslike.

"Willie," he said, "I have in mind a scheme to make use of certain materials now being wasted in the mess. We shall require [illegible] pigs [illegible] at the end of our [illegible].

"You know as well as I that there have been complaints about the high proportion of canned food we've been forced to serve the troops.

"What I'm planning, Willie"—and he looked at me sternly, though I could tell he was hoping very much that what he was about to say would be well received—"is to raise pigs."

I was suddenly attacked by a coughing spell. I had to cover my mouth. When I recovered [illegible] all I could think to say was, "Yes, sir."

Stifling [illegible] the [illegible] passed on.

"Your [illegible] table allows for an extra officer. He shall be in charge of the pigs."

My tenure was short [illegible].

[illegible]

I walked out of the colonel's office [illegible] carrying with me the [illegible] O.I.C. the Pig Section.

The arrival of the pigs, a whole planeload

Training for Arctic Duty, Men and Dogs Mush Along a Winter Trail to Maine

[illegible]

of them, was the occasion for much picture taking. I helped unload five sows and 25 piglets. I'm sure that plane's crew would have found a much better use for clothespins on that flight than to hang up clothes!

Proper pens were built, and I went into action as male nurse to Fish Hassell's pigs. The situation was so amusing, and brought such notoriety, if not fame, to Goose Bay, that I didn't find the work too distasteful.

I Dreamed About Pigs

The trouble was I used to dream about pigs. I recall one dream in which I reviewed a line-up of scrubbed porkers. They were all primly at attention, and I was pinning medals on their chests and new stripes on those that had just made corporal.

The venture did help to improve the soldiers' grub. I often wondered how the animals did so well without skim milk, usually a staple of pig diet.

I didn't dare breathe that to Colonel Hassell. He would have brought in a herd of cows—and made me C. O. of Bovines!

At last the war came to an end and I returned to the United States. Settling with my family near Rockport, Massachusetts, I set up as a painter and sculptor.

But still I hankered after the Arctic.

"What is it that sends you back, time and again, to the far north?" friends ask me.

It's a hard question to answer.

There are sights and sounds and smells in the Arctic that you accept quite casually while you're there, but hunger for fiercely when you're far from them.

A stately iceberg cut with blue-green caves makes a stunning foreground to brown mountains splashed with wild poppies. It's fine to see a herd of shaggy musk oxen grazing on lush Arctic prairies.

The howl of dogs under the moon, the walrus's snort, and the hiss-hiss of sled runners on dry snow—memory of these sounds makes me homesick for the North.

There's an inexplicable joy in watching geese and ducks fly north in spring. The faint track of the lemming and the tail mark of the Arctic fox are friendly evidences that it's not really an empty land.

The eternal struggle for survival seems a grim business when you see the wolf haul down the caribou calf. But it seems less grim as you, in turn, feast on juicy haunch of musk ox!

The short summer spreads a springy quilt of moss and multihued flowers, yet the frosty bite of a winter morning and the howl of the blizzard are welcome, too.

Perhaps deeper than these physical appeals is the sense of absolute independence and self-reliance that goes with travel on the Arctic trail. Spiritual exaltation is a nearly constant companion, not just a chance experience.

You are alone with whatever God you praise, and you find it good and true.

A surprising, and impressive, fact about the Canadian and United States personnel manning the new chain of Arctic weather stations is that 90 percent of the boys want repeat assignment to the *same* spot for a second tour of duty. But, almost to a man, they are ready, willing, and eager to go to a new station.

Then there's comradeship, comradeship intensified by isolation and mutual dependence. When you find and enjoy friendship under the exacting conditions of Arctic living, you cherish the memory forever.

Some men, of course, have more down-to-earth reasons for their Arctic-philia. The Norwegian hunter and archeologist Sören Richter, prodded to tell what he liked about the northland, said: "Up there, plenty of musk oxen. I can eat all I want. There's no one there to tell me I'm too fat."

Two years after I left the Air Forces a new opportunity to go north came my way.

Charles J. Hubbard, Chief of Arctic Operations Project of the United States Weather Bureau, had been my friend for a long time. With his encouragement I applied for assignment as a civilian officer at one of the new Canadian-United States weather stations in Arctic Canada.

Filling Gaps in Weather Maps

After the recent war, the U. S. Weather Bureau and the Department of State worked out with Canada an agreement for erecting a number of Arctic weather observation stations. They would be scattered through an area that was one of the biggest blanks in the world as far as weather-report coverage was concerned.

War-built weather stations in Greenland, Iceland, Baffin Island, and mainland Canada had given inestimable aid to forecasts for flights in the North Atlantic area. Their success was the best reason in the world for extending this far-north coverage to the Arctic archipelago of North America (pages 556, 562, 563).

This boldly planned chain of weather stations now has been constructed. Some of them are supplied and manned entirely by air. They cling to remote islands that cost explorers like Stefansson, Sverdrup, MacMillan, Peary, Greely, and others months of

This Two-passenger Helicopter Flew Out 11 Stranded Airmen, One at a Time

[illegible]

[illegible] on the [illegible] and not a few lives.

Thule, on the northwest tip of Greenland, was [illegible] operated jointly by Danes and Americans. Installations at Resolute Sound, Cornwallis Island; Prince Patrick Island; and [illegible] Island, have followed. These are operated by Canada and the United States. A fifth station, Alert, is now being planned for a site northwest of Cape Sheridan, on Ellesmere Island.

[illegible] have been [illegible] important [illegible] international and [illegible] support of the Canadian and Danish Governments. [illegible] and cooperation [illegible] of [illegible] have been [illegible].

The Weather Bureau [illegible] United States [illegible] of the [illegible] Prince Patrick Island station. A Canadian would be [illegible] in [illegible].

[illegible] Cornwallis Island [illegible] long flight [illegible] length of Baffin Island [illegible] Cornwallis [illegible] particular [illegible]

Men Push Ice Away So a PBY Can Take Off with a Sick GI

[illegible]

[illegible] Navy and Coast Guard [illegible] Arctic [illegible] Greenland [illegible] Arctic Circle.

A seaplane bearing Rear Admiral [illegible] U. S. Wonder Station [illegible] Greenland [illegible] 3,000 miles [illegible] of the North Pole. [illegible]

[illegible]

Helicopters spotted routes for the ships through the ice. With their help, two of the task force's three ships pushed past 82° north.

At Cornwallis Island I made my final plans for moving into Prince Patrick. On March 29 we took off in a C-47 cargo plane on skis for a reconnaissance of the island. On the way we spanned the full length of rugged, rumpled Melville Island.

We selected Mould Bay for the permanent camp. On April 12, making our major landing, we slid to a smooth stop there.

Our first job was to improve the ice landing strip. From a big timber we brought in by air (this district is hundreds of miles north of the tree limit) we made a drag scraper. Pulling it with an air-borne tractor, we skimmed the loose snow off the drifted end of the runway. Soon we had a very respectable landing strip cleared and packed.

Then began the "Prince Patrick Airlift." A procession of C-54's, buttressed with one C-82 ("Flying Boxcar"), poured supplies into Prince Patrick so fast we could hardly keep them classified and the perishables and instruments under cover.

What a mass of stuff! There were cages, bolts and [illegible] ing, radios, medical stores, and a Diesel generator to make electricity.

There were several kinds of fuel and oil; there were lumber, wallboard, weather instruments, there were stoves, nails, tools, dynamite, and a generator to make hydrogen for filling meteorological balloons.

We unpacked excavating saws and an ice cream mixer. There was a library of books.

Erecting the James huts and storing all this huge inventory of essential supplies taxed the strength of the station personnel to the limit. After all, there were only seven of us.

But I managed to find a few hours to look around this new country.

Fighting Wolves with a Searchlight

On Prince Patrick caribou and musk oxen were fairly numerous. Their chief enemy, the Arctic wolf, seemed to be scarce there.

At the station on Eureka Sound, by contrast, wolves are so abundant that the frightened musk oxen stick close to the Canadian-U. S. camp during the long winter night.

At Eureka musk oxen prefer men to wolves (a hard choice). When the wolves followed the big animals right into camp, the station crew rigged a Navy searchlight.

Before the observer steps out to take his observation at the instrument shelter, the men sweep the area around camp with the high-candlepower beam. It's the only way they can make the bold wolves keep their distance.

After all the good-luck years I'd had in the North, bad luck, long overdue, hit me.

We were moving a crosstree into the main hut. Two of the boys took one end. Feeling strong as any two men, I foolishly lifted the other end myself.

Misfortune Has Its Day

When I took the weight on my arms, the thrust down on my feet drove my left leg instantly down through the crust, right to the ground. I knew I'd strained my left side badly.

Paul Chorney, the Canadian leader, knew I was hurt, but none of the others seemed to notice it.

"Don't tell the other boys," I told him.

That happened on April 19. When I did not improve, the boys radioed for a plane to come in and take me out for medical treatment. I protested, but knew they were doing the right thing.

On May 29 a ski plane from Greenland glided in and took me away. I nearly wept, being forced to leave so many months before my contract time was up.

On the flight to southern Greenland by way of Thule and Sondre Strømfjord, we soared over regions in the northern Parry Islands and southern Ellesmere Island I'd never seen before.

We passed the Findlay Group, including Grosvenor Island, named by Stefansson in 1916 for Gilbert Grosvenor, President of the National Geographic Society, and Cornwall Island.

At the United States base at Narsarssuk, southern Greenland, I entered the military hospital for a checkup. I learned I'd strained myself severely, but that with care and rest I'd be ready to go north again within a year.

American soldiers who were stationed at Narsarssuk during the war would barely recognize the place today.

The barracks are painted white. Many of them have been converted to married quarters. Wives and children of military personnel stroll laughing up and down the roads of the base.

A school bus stops at every corner to pick up Young America Overseas and deliver him to the gentle mercies of the teacher. Family laundry hangs on clotheslines just as it does in Winnetka or Sacramento.

I returned unwillingly to the United States in June, 1948.

How the North has changed! Yet in the vast reaches between the few places where men have brought their civilized skills to bear, the North actually has not changed at all.

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ORGANIZED FOR THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE

To carry out the purposes for which it was founded sixty-one years ago, the National Geographic Society [illegible] this Magazine monthly. All [illegible] in The Magazine itself or expended directly to advance [illegible]

Articles and photographs are desired. For [illegible] The Magazine uses generous remuneration is made.

In addition to the editorial and photographic [illegible] constantly being made, The Society has sponsored more than [illegible] years of field work to achieve these objectives.

The Society's popular expeditions have pushed back the frontiers of the southwestern United States to a period twenty eight centuries before Columbus crossed the Atlantic. In during the years of the very extensive developments in that region, The Society's expeditions added several [illegible] that had passed unknown for [illegible]

In Mexico, The Society and the Smithsonian Institution, January 15, 1932, discovered the oldest [illegible] in the Americas, a [illegible] we have a date. [illegible] inscribed in Mayan characters with a date [illegible] November 4, 291 B.C. (Correlation), [illegible] America and [illegible] a great [illegible] culture previously unknown.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army [illegible]

Capt. Albert W. Stevens and Capt. [illegible] [illegible] in the stratosphere [illegible] scientific instruments of [illegible] results of extraordinary value.

The National Geographic Society-U. S. Army Air [illegible] expedition, from a camp in southern Brazil, photographed and observed the solar eclipse of 1937. This was the seventh expedition of The Society to observe a total eclipse of the sun.

The Society cooperated with Dr. Wallace Broecker in [illegible] Bermuda during which a world [illegible] of 3,000 feet was attained.

In Society grants, $13,000, and in addition $10,000 was given by individuals and others, to the [illegible] was used to [illegible] of the giant sequoia trees in Sequoia National Park of California were a special interest to the American people.

One of the world's largest [illegible] glacial [illegible] outside the polar regions was discovered in Alaska and [illegible] by Bradford Washburn while exploring for The Society and the Harvard Museum of Exploration, 1938.

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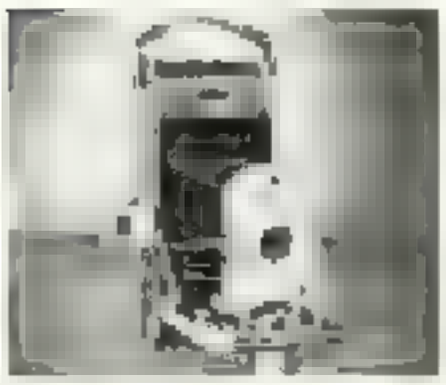

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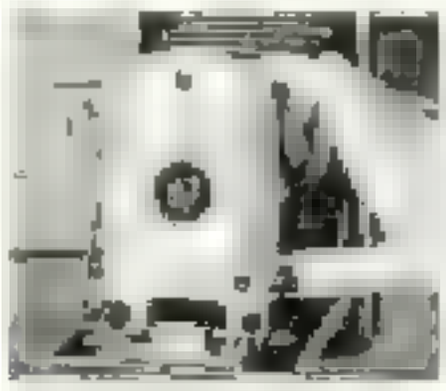

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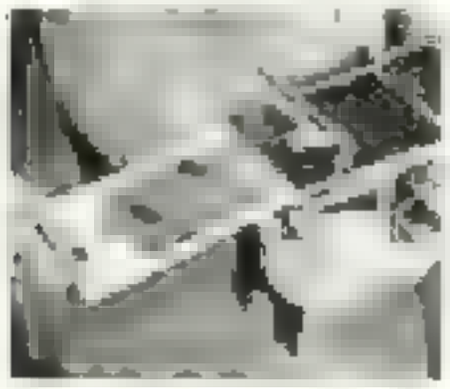
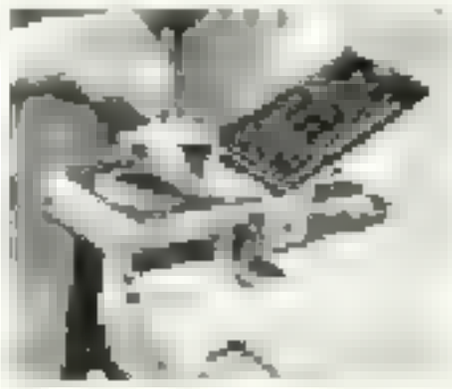


5. Then pull a tab. Film slides between special rollers and picture emerges.



6. Sixty seconds later, peel off the picture. Prints are dry, white borders and rounded corners ready for frame or album.

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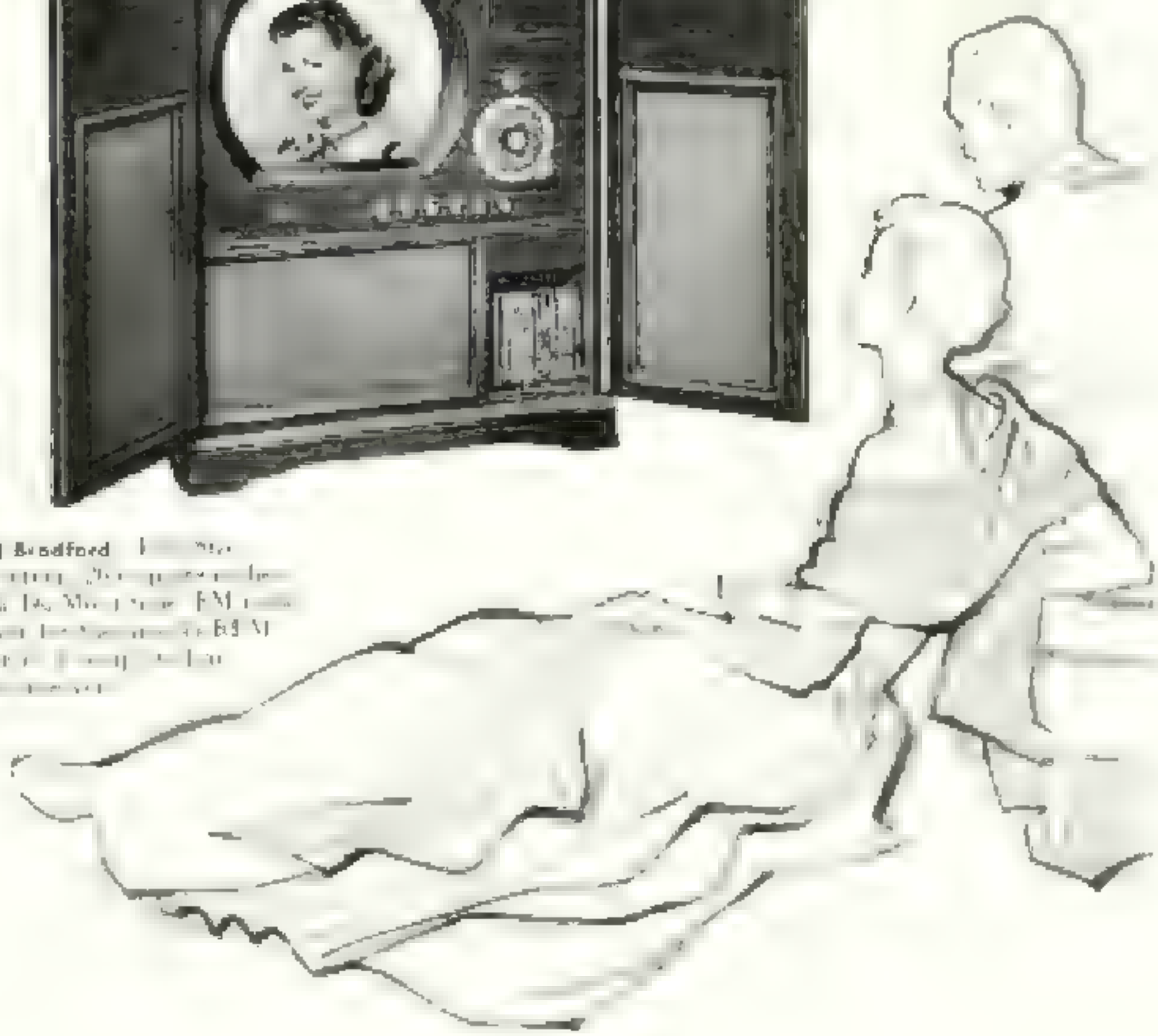

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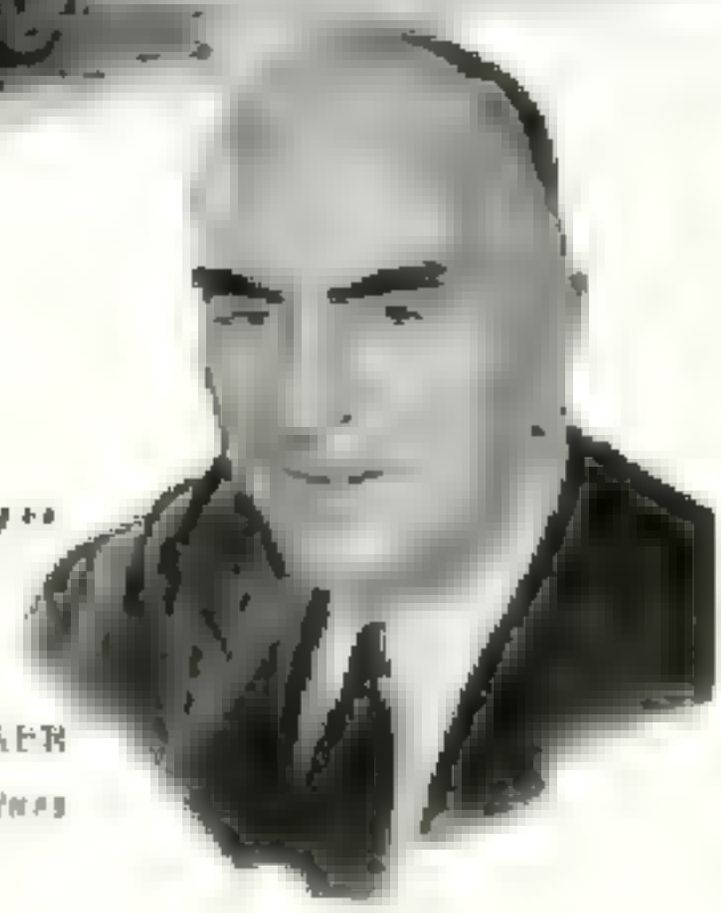

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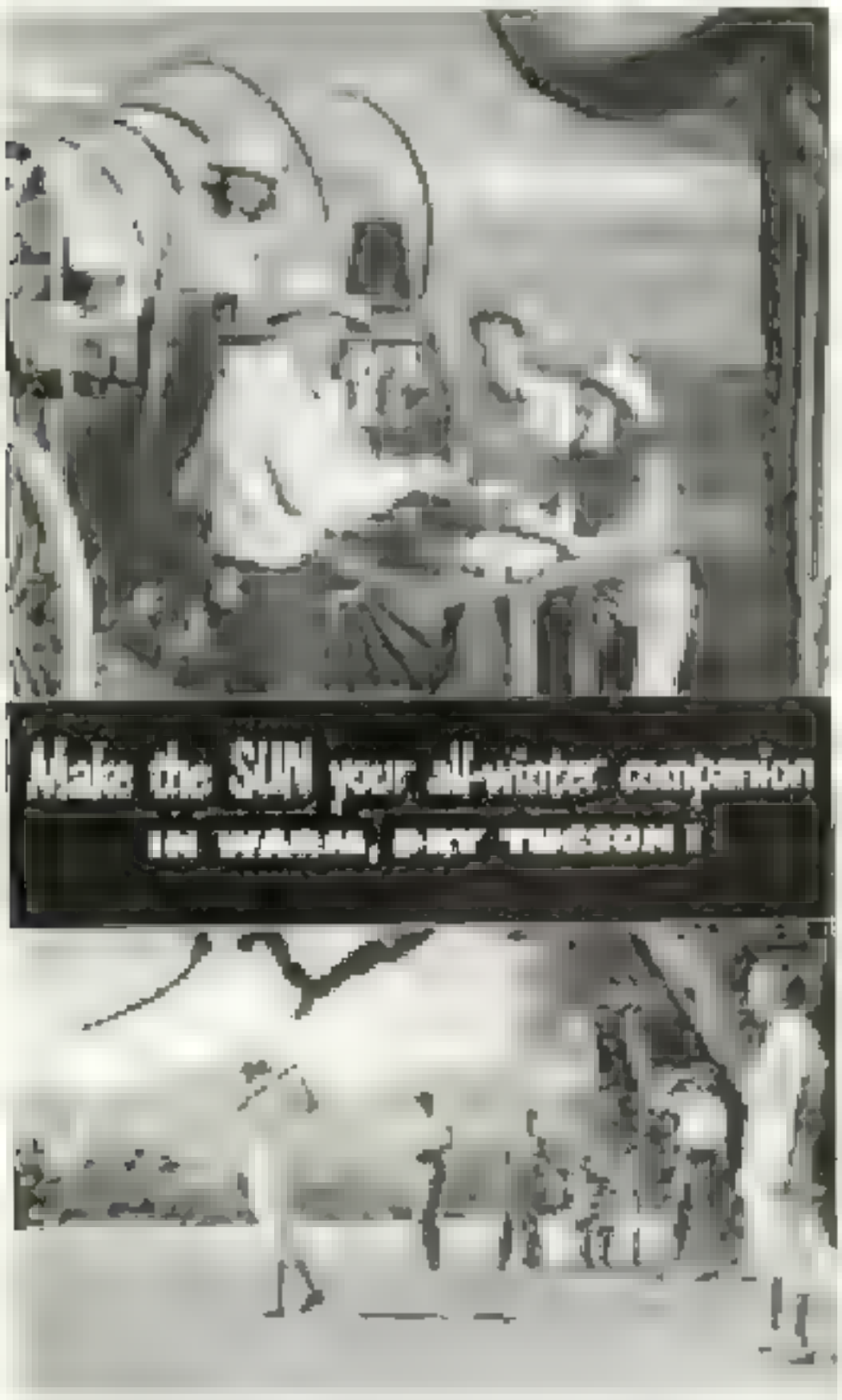

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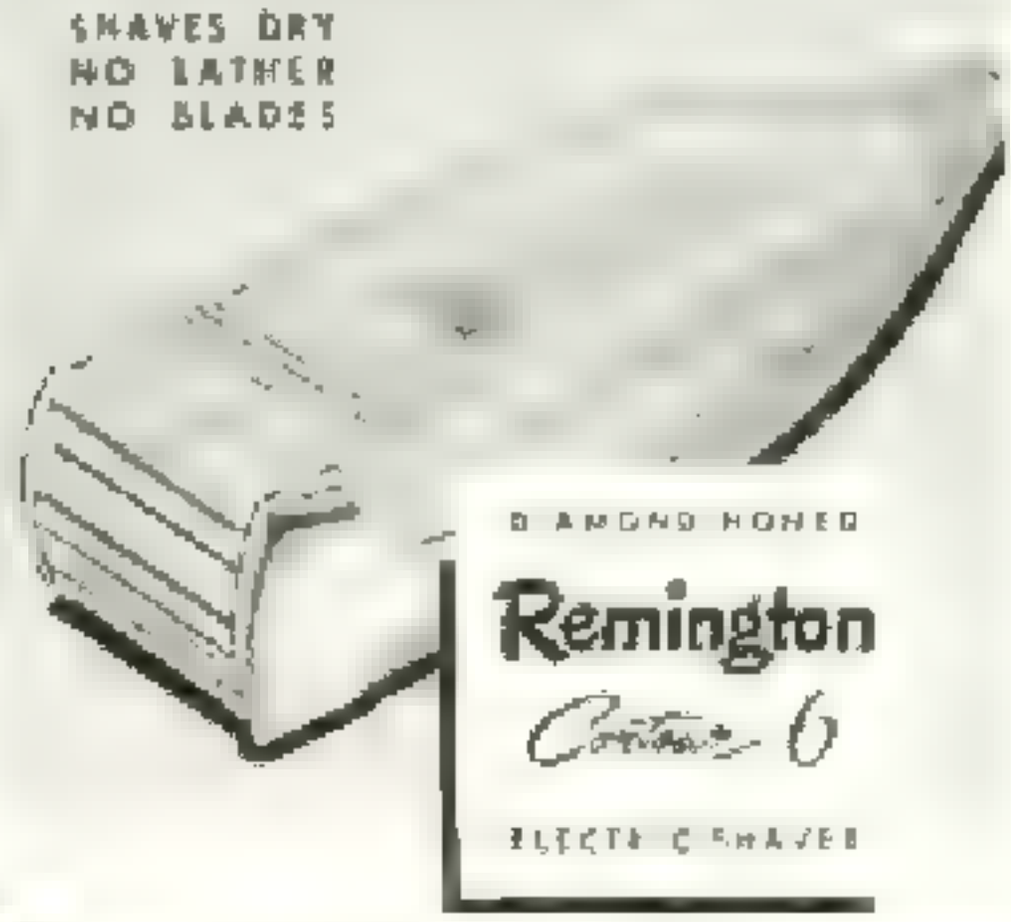

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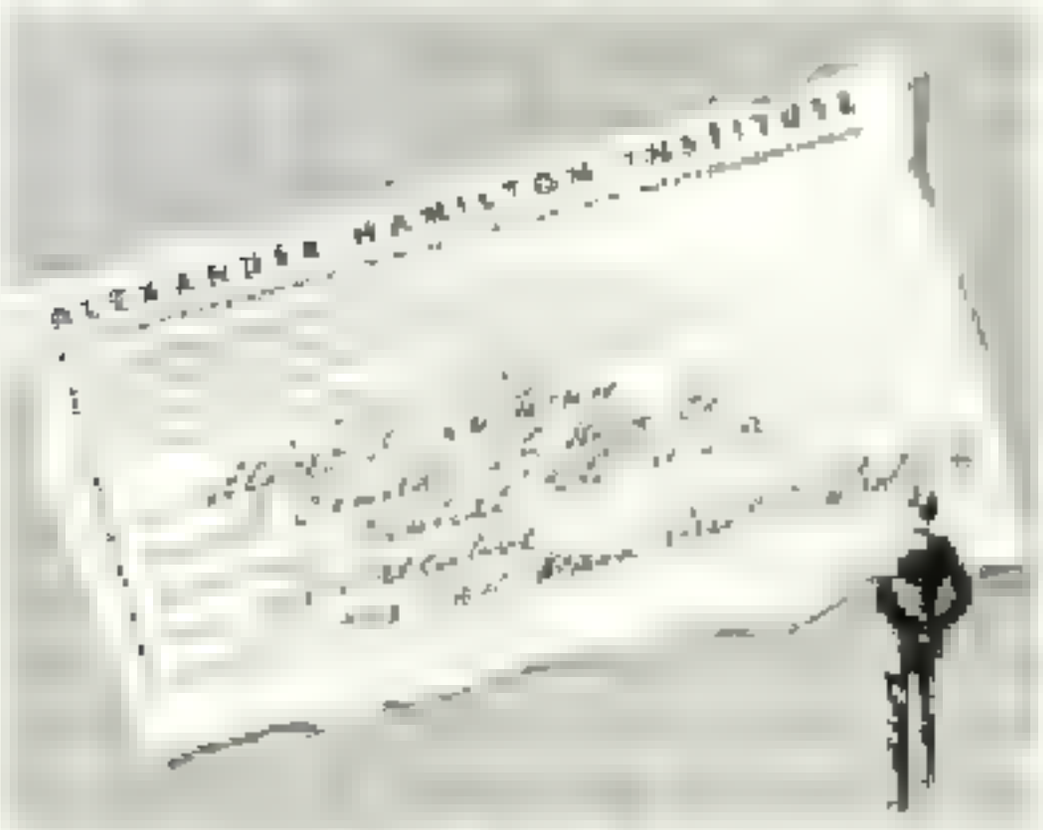

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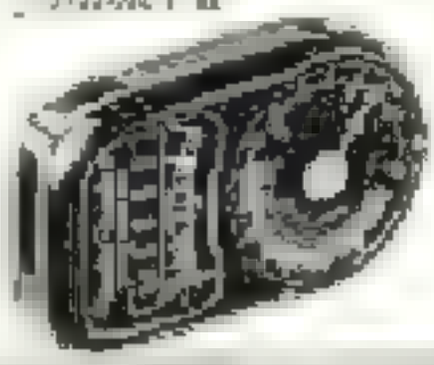
Only a [illegible] correct exposure [illegible] them! Likewise, too little, or wasted [illegible] too much. The WESTON Exposure Meter assures [illegible] true pictures every time. Instantly [illegible] any picture [illegible] See the WESTON at leading photo dealers everywhere.

Master II



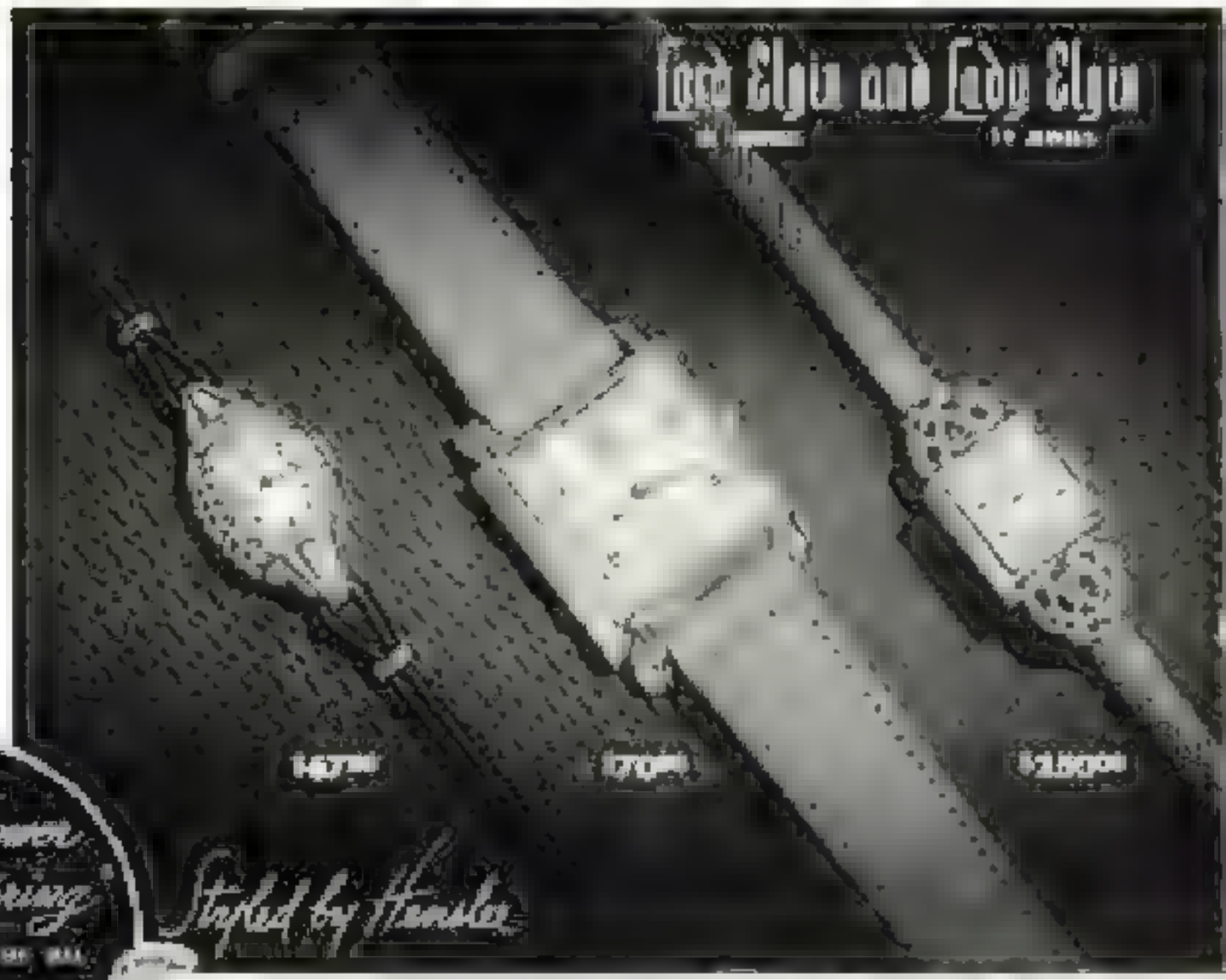
WESTON *Exposure Meters*

The meter most photographers use

Anniversary present for Mrs. William H. Miller an Elgin

"I ADORE ITS DISTINCTIVE STYLING," says Mrs. Miller. "My new Elgin is the most wonderful of all anniversary presents."

"THAT DURAPOWER MAINSPRING FORETELLS A HAPPIER FUTURE." says Mrs. Miller. "Elgin accuracy will surely be more lasting."



Styled by Hamilton

ELGIN

TIMED TO THE STARS

An Elgin Watch is a most beautiful and lasting way to remember the greatest occasions of life. Here is a possession to suit the owner's pride now and the years ahead . . . a practical accessory enriched with exquisite charm. So outstandingly styled are the new Elgins that they won the Fashion Academy Gold Medal Award!

And no other watch in the world has such dependable power for accurate timekeeping. Drop in at an Elgin and you get the miracle DuraPower Mainspring. To own yourself, or as an exciting gift for someone you love, consider it . . . there's *more happiness with an Elgin.* See your jeweler now and choose from his fine array of beautiful new Elgins.

The Regality of Television

Only Zenith Giant-Picture Television Gives You All This!

165 sq. in. Giant Circle Picture

Television's largest direct-view picture [illegible]

New Glare-ban "Black" Tube

[illegible]

One Knob Simplified Automatic Tuning

[illegible]

New Zenith "Sr. Regis" [illegible] **$399.95***

See Zenith's Great New Radio Values, too!

New Zenith "Major"— [illegible] **$39.95***

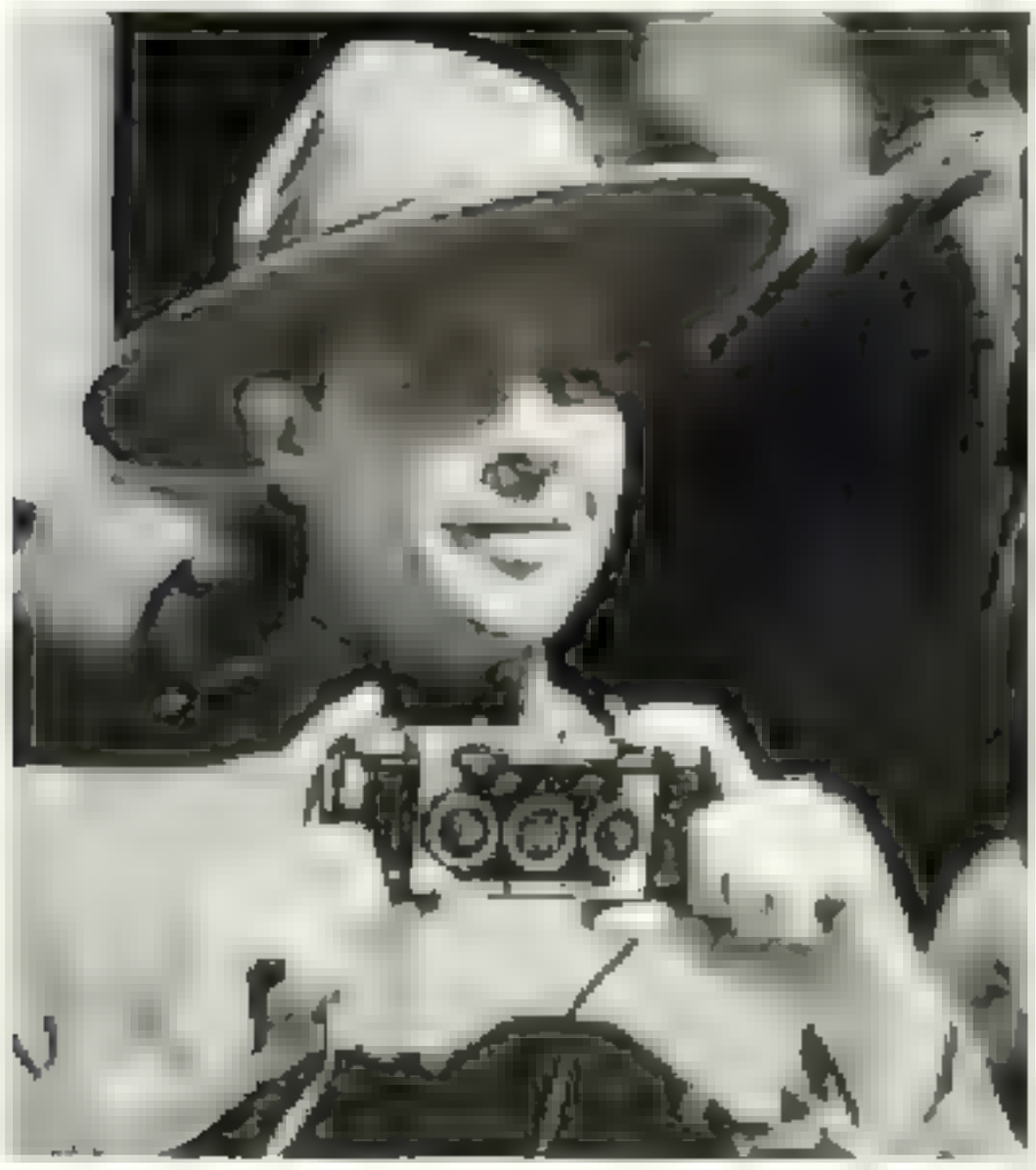
ZENITH RADIO and TELEVISION

*Price subject to change without notice.

Zenith Radio Corporation, Chicago 39, Ill. • Also makers of America's Finest Hearing Aids

People who know Picture-taking and picture-making — PREFER THE Stereo Realist

THE CAMERA THAT PUTS 3rd DIMENSION ON FILM



Dick Powell Now starring in "Mr. Mike" A United Artists Release ... Watch for it!

Says: "No other camera I've ever owned gives me so much fun, such amazing pictures.

[illegible]

STEREO **Realist**

THE CAMERA THAT SEES THE SAME AS YOU

It's FUN!

SHOW YOUR COLOR PICTURES ON A

DA-LITE

"CRYSTAL-BEADED" SCREEN

The Beautiful, New DeLuxe Challenger

[illegible]

DA-LITE THEATER QUALITY SCREENS

America's Finest Since 1909

A BRIGHT AUTUMN AWAITS YOU IN Ontario

CANADA'S A YEAR-ROUND VACATION PROVINCE

Colours bright as an Indian's headdress ... sparkling air and brilliant sunshine make Ontario an autumn wonderland. Motor or stroll along sunflecked roads and forest trails. You'll sleep like a log in comfortable inns through still cool Ontario nights.

Write for information.

There's golf, rowing, fishing, hunting ... fun time for everyone in Ontario.

Ontario Trans
[illegible] Parliament Buildings,
Toronto 2 Ontario

Please send me free information about Ontario.

NAME _____

STREET _____

CITY _____ STATE _____

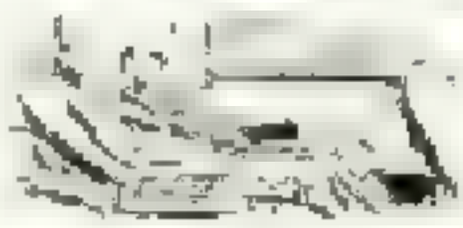
The ***homing pigeon*** *goes to sea*

The meaning of RCA research

RCA's contribution to the development of [illegible] the national [illegible] of the [illegible] product or [illegible]

RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television



"SCENIC-WAY" TO CALIFORNIA

TAKE THE VISTA-DOME *California Zephyr*

Extra Pleasure • Extra Comfort • No Extra Fare

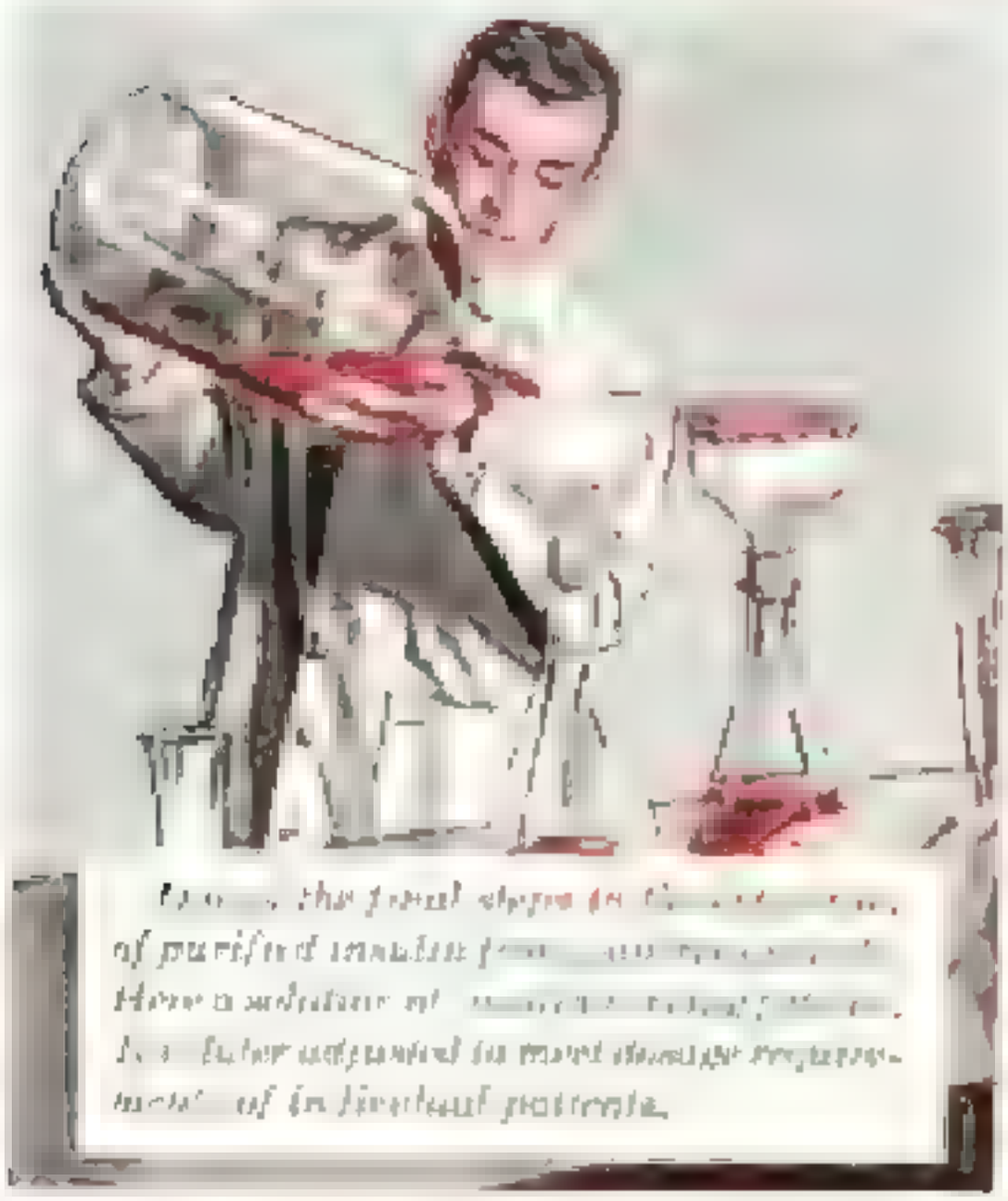
Scenic way is right! Only the [illegible] California Zephyr gives you the double thrill of riding the most wonderful train in the world right *through* America's most wonderful scenery. And *what* a way to see it! The scenic-way way. [illegible] up [illegible] down [illegible] comfort [illegible] Rocky Mountains [illegible] Feather River Canyon in sunlight or moonlight. You can choose [illegible] Vista-Dome [illegible] Pullman, dining room [illegible] roomettes and sections. Through sleeper daily between New York and San Francisco.

NEW, FASTER DAILY SCHEDULES

WESTBOUND (Read Down)		EASTBOUND (Read Up)
3 30 PM Lv	Chicago	Ar 1 30 PM
11 59 PM Lv	Omaha	Ar 4 55 AM
1 19 AM Lv	Lincoln	Ar 3 40 AM
6 40 AM Lv	Denver	Ar 7-00 PM
	Colorado Rockies	
1 53 PM Lv	Glenwood Springs	Lv 1 5 PM
9 22 PM Lv	Salt Lake City	Lv 5 40 AM
	Feather River	
7 00-11 00 AM	**Canyon**	7 30-6 30 PM
2 28 PM Lv	Sacramento	Lv 12 50 PM
3 36 PM Ar	Stockton	Lv 11 53 AM
4-00 PM Ar	Oakland	Lv 9 44 AM
4 50 PM Ar	San Francisco	Lv 9 00 AM

BURLINGTON • RIO GRANDE • WESTERN PACIFIC

Progress in fighting DIABETES



[illegible] the final steps in [illegible] of purified insulin [illegible] Here a solution of [illegible] is being injected in most dramatic experiment of in Lilly's [illegible] portrait.

What medical science is doing . . .

[illegible] has made in controlling diabetes. The discovery of insulin in 1921 has led to a much greater life expectancy for the average diabetic today. For example, at age 40, the expectancy is more than twice what it was before insulin was developed.

Medical science is still on the march. It has developed different types of insulin. Some are quick acting with a short term of effectiveness, while others are slower acting but longer lasting.

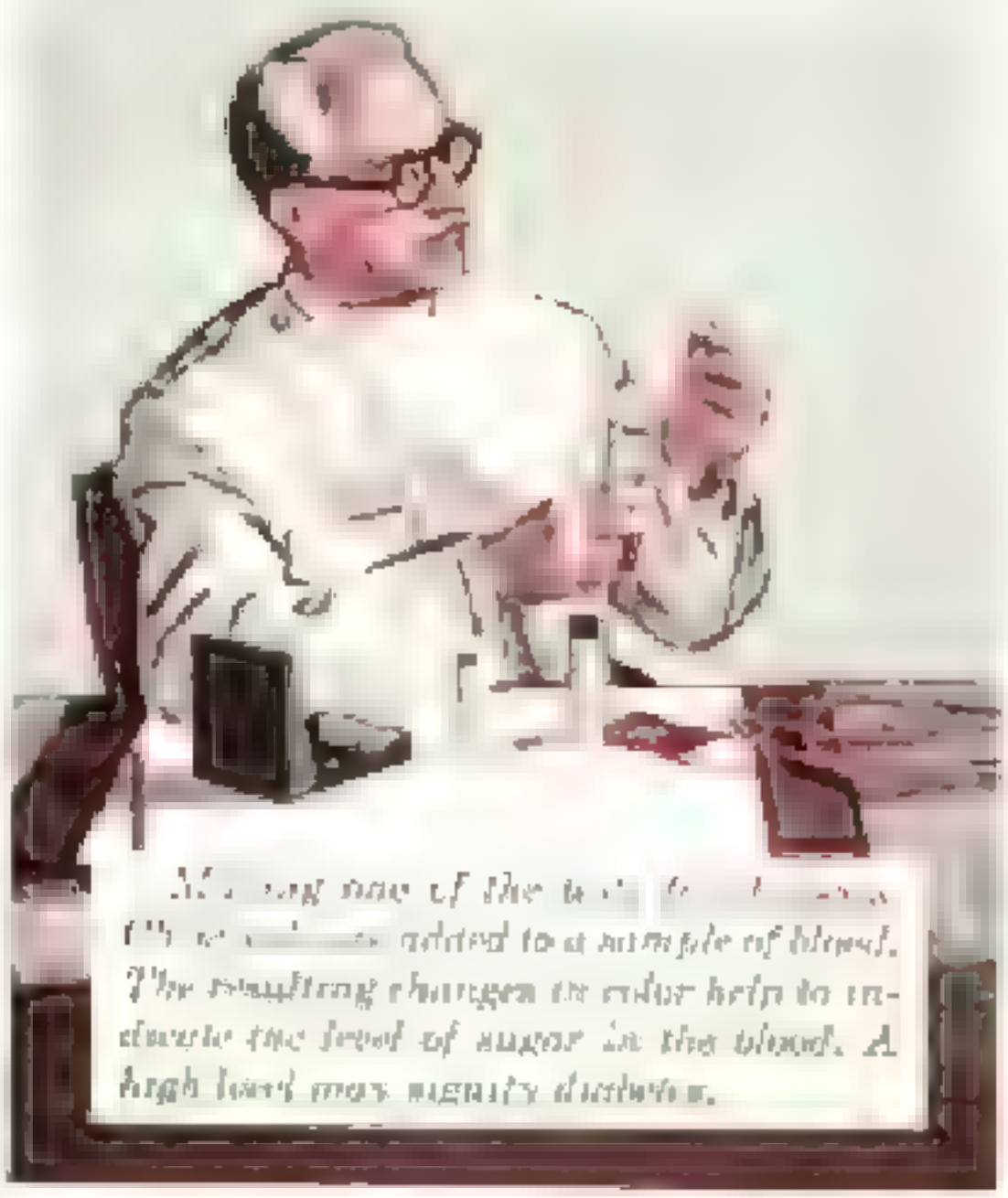
In addition, it has been discovered that diabetes can be produced experimentally with a substance called alloxan, as well as by other means. This may shed new light on how and why the disease develops. Various studies, including research with radioactive [illegible], also offer hope for important advances in the treatment, and perhaps the prevention, of diabetes.

What you can do . . .

Recent surveys [illegible] that in addition to the million known diabetics [illegible] another million people in our country [illegible] diabetes and are unaware of it. So it is wise [illegible] to keep alert for these warning signals [illegible] thirst, hunger, or urination, [illegible] sexual fatigue, or loss of weight. It is important to see a doctor at once if any of these conditions appear.

Doctors recommend that everyone have an annual physical examination, including tests for diabetes. These tests are especially important for those who have diabetes in the family, those who are overweight, and those past 40.

While there is as yet no cure, modern medicine can generally control diabetes through careful diet and exercise. By following the doctor's advice about keeping these three factors in proper balance, it is usually possible for the diabetic to live a practically normal life.



Measuring one of the [illegible] added to a sample of blood. The resulting changes in color help to indicate the level of sugar in the blood. A high level may signify diabetes.

Metropolitan Life Insurance Company

(A MUTUAL COMPANY)

1 Madison Avenue, New York 10, N. Y.

To learn more about diabetes, send for Metropolitan's free booklet, entitled "Diabetes."

Name _____

Address _____

City _____ State _____

At night, the riverbanks shouted a warning

[illegible]

[illegible]

[illegible]

Double recipe - double pleasure

TWIN SPAM BAKE

TWIN SPAM BAKE

No frills—just good eating. And so easy—take SPAM for 20 minutes at 350°, plain or covered with ½ cup fruit juice such as pineapple, peach or prune. Baste twice. Put vegetables alongside—tell the company dinner's ready.

COLD OR HOT SPAM® HITS THE SPOT!

HORMEL GOOD FOOD

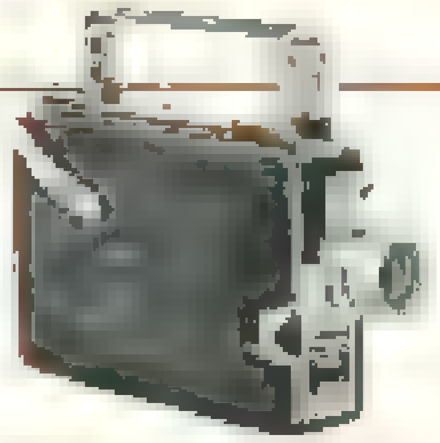
Cine-Kodak Magazine 8 Camera [illegible]

Kodascope Eight-33 Projector [illegible]

H[illegible] making and showing [illegible] Cine-Kodak [illegible] Magazine 8 Camera, with [illegible] Kodak [illegible] $147.50 [illegible] Cine-Kodak [illegible] Kodak [illegible] Kodascope [illegible] Projector, with [illegible] lens and 500-watt lamp, $7[illegible] Eastman Kodak Company, Rochester 4, N. Y.

(Prices include Federal Tax where applicable.)

[illegible]



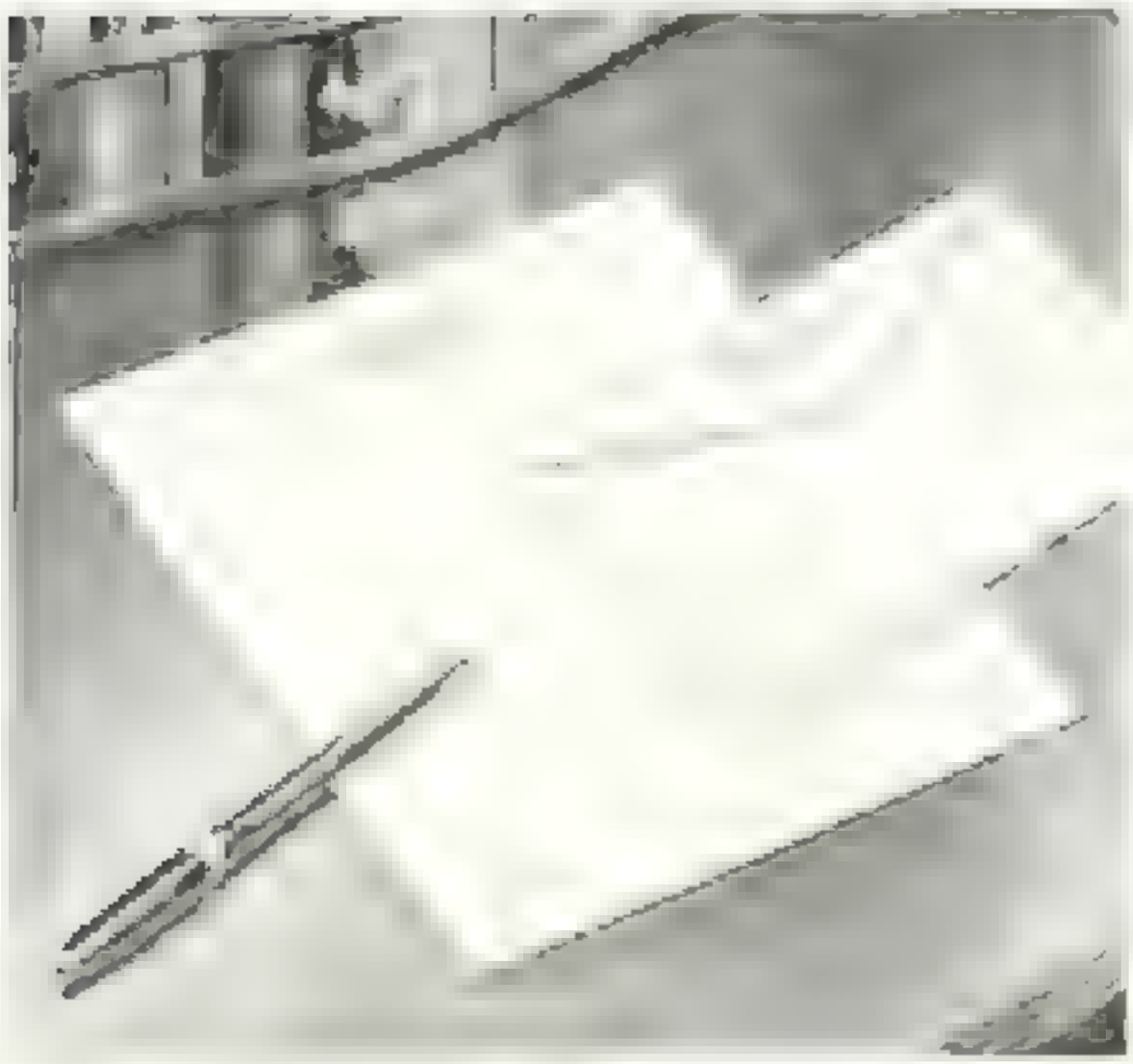
If it's bigger movies you're after

Cine-Kodak Magazine 16 Camera [illegible] Magazine 8 [illegible] movies [illegible] as well as [illegible] f/1.9 [illegible] $175

Kodascope Sixteen-10 Projector f/1.6 lens, 750-watt lamp, $135. Kodascope Sixteen-20 Projector, with [illegible] $2[illegible]5 with [illegible]

Kodak

Shop from your desk!



Standard Package

[illegible] $1.00

Envelope Package

[illegible] $1.00

Correspondence Card Package

[illegible] $1.50

Deluxe Package

[illegible] $2.00

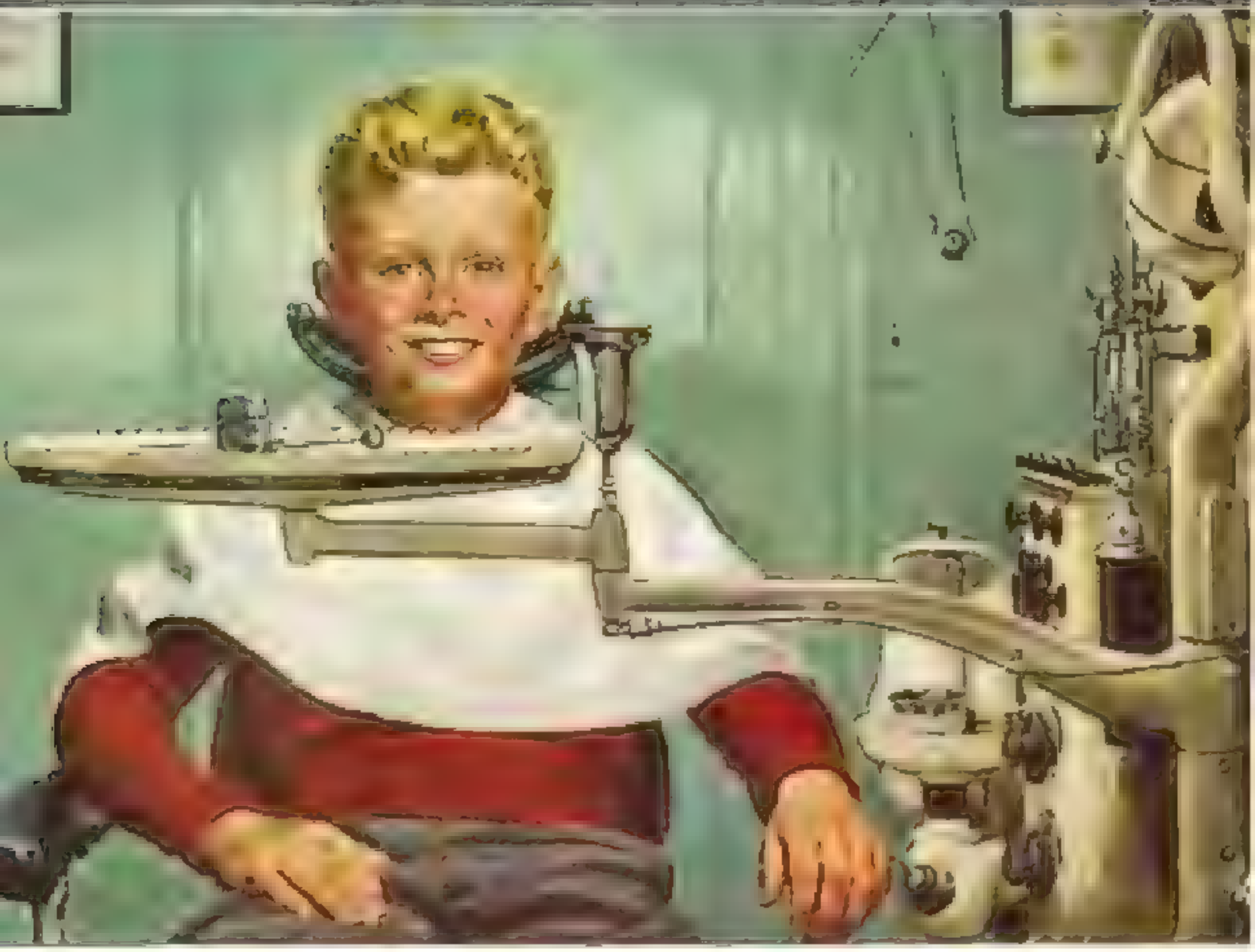
If you shop by mail or pay by [illegible] of American Stationery should be in your desk. It saves your time and protects your mail. And it's [illegible] the nation's great stationery value! [illegible]

THE AMERICAN STATIONERY COMPANY
[illegible] PARK AVENUE • PERU, INDIANA

For Christmas

American Stationery

THE FINE STATIONERY
IN THE PLAIN BOX



"Didn't Hurt a Bit!"

[illegible]

[illegible]

[illegible]

For a full measure
of travel pleasure . . . .
Ride Union Pacific

Streamliners

DAILY BETWEEN CHICAGO
AND LOS ANGELES · PORTLAND
SAN FRANCISCO · DENVER

UNION PACIFIC RAILROAD

"We have a System...

that saves our Car our Time and our Money"

. . . in a hundred convenient ways

The family automobile is indispensable. But [illegible]

. . . to avoid "traffic nerves"

[illegible]

It's smart to have two cars, when one of them's a Greyhound!

Families using this "two-car system" are getting more [illegible] travel [illegible]

They do it by keeping the faithful family car at home [illegible] Greyhound for dozens of different trips each year. A Greyhound [illegible] a fraction as much as [illegible] a private auto—much less than any other form of public transportation.

. . . on short or long trips

[illegible]

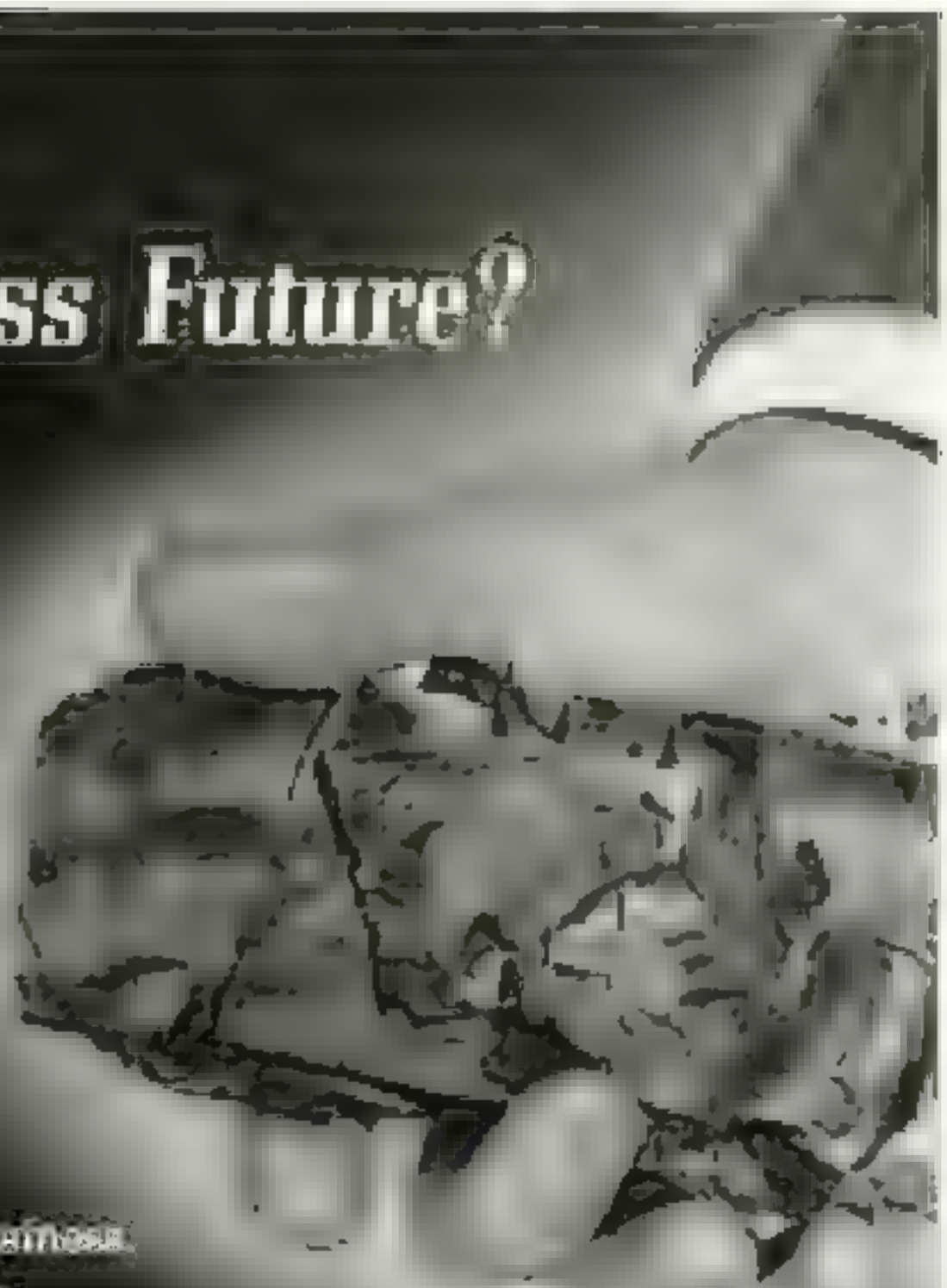
. . . for business or pleasure

Nearly at [illegible] Business [illegible] enjoy our frequent schedules.

A LOT MORE TRAVEL...
***for* A LOT LESS MONEY!**

GREYHOUND

YOUR Business Future?



A little pile of ashes,
a few charred papers
—all that remains
of a bright future.

These were the records a company *must* have to do business.

4 out of 10 firms never reopen after losing their records in fire.

You *must* protect your records—and ordinary files won't save them in a real fire. Only a *modern* safe offers dependable protection—and unless your safe carries the label of the independent Underwriters' Laboratories, Inc., you simply cannot rely on it!

The Mosler "A" label safe—tested for at least 4-hour fire protection—is the finest protection your records can have. Yet these safes actually cost far less than you'd expect.

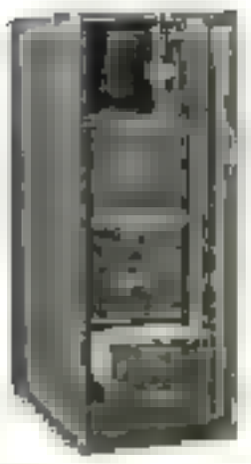
Don't wait until fire strikes—write today for the address of your local Mosler dealer and the free booklet "What You Should Know About Safes." Please address Dep't 410.

The Mosler Safe Co.

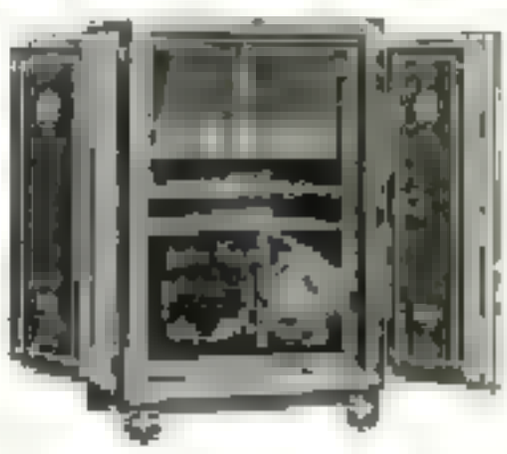
Main Office: 320 Fifth Avenue, New York 1, N. Y.

Dealers in principal cities. Factories: Hamilton, O.

Largest Builders of Safes and Vaults in the World



All the convenience of a file with the protection of a safe in Mosler Insulated Record Containers



Mosler "A" Label Safe with Combination Lock chest for dual protection against fire and burglary

Gateway of the U. S. Gold Storage Vault Room at Fort Knox, Ky.

PLEASE FILL IN BLANK BELOW, DETACH AND MAIL TO THE SECRETARY

Recommendation for Membership

IN THE

NATIONAL GEOGRAPHIC SOCIETY

** The Membership Dues, Which Are for the Calendar Year, Include Subscription to the National Geographic Magazine*

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington 6, D. C.: _____ *1949*

I nominate _____

Occupation _____
(This information is important for the records)

Address _____

_____ ***for membership in The Society.***

Name of nominating member _____

Address _____

* DUES: Annual membership in United States, $4.00; Canada, $5.00; abroad, $5.00. Life Membership, $100.00 U. S. funds. Remittances should be payable to National Geographic Society. Remittances from outside of continental United States and Canada should be made by New York draft or international money order.
10-49

2. See water and shock-resistant, self-winding, calendar watches, chronographs, other Swiss developments. *It's the movement that counts—be sure your watch has a quality Swiss jeweled-lever movement.*

3. The "heart" of a quality watch movement is the jeweled-lever for greatest accuracy with minimum wear. *Don't be fooled by so-called "watch bargains"—you usually get just about what you pay for.*

1. By the age of twelve, the average boy and girl are mature enough to recognize the value of time, to plan days thoughtfully, to handle a precision instrument. When you buy a watch, make sure it has a quality Swiss jeweled-lever movement. This feature is your assurance of accuracy, dependability, and value. See the newest in watches during "The Watch Parade," Oct. 24—Nov. 7.

Time for his first good watch...

4. Today, the Swiss jeweled-lever movement is the standard of quality all over the world. That's why a *smart Swiss watch is a treasure of lasting pride—for you—or for the fortunate one who receives it from you.*

5. All quality Swiss watches can be serviced economically, promptly. When you buy, *rely on a jeweler in whom you have confidence—he'll show you the best jeweled-lever Swiss movements in your price range.*

For the gifts you'll give with pride—let your jeweler be your guide

The WATCHMAKERS OF SWITZERLAND